WATTL… …UTE
14 JUL 1956
UNIVERSITY OF NATAL, P.M.B.

GRICULTURAL *Chemicals*

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June, 1956

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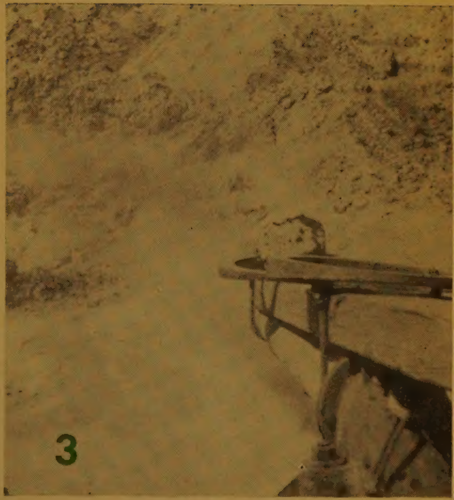
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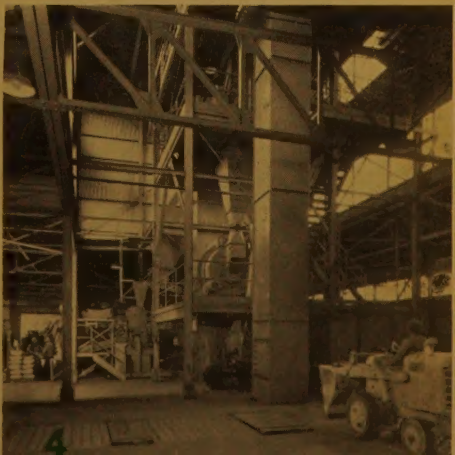
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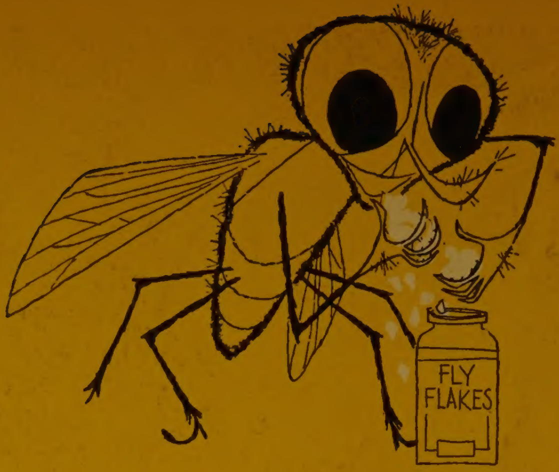

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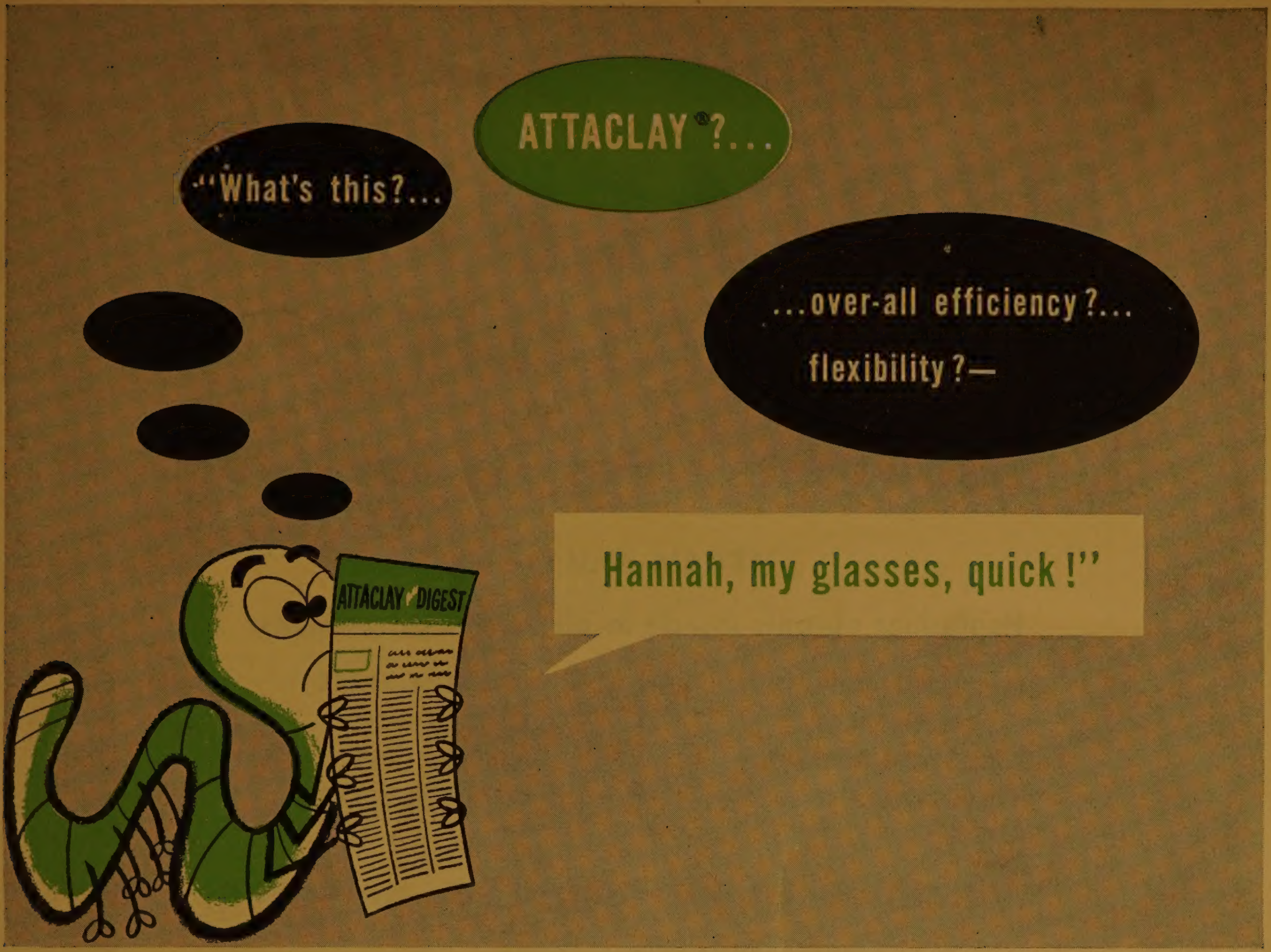
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AGRICULTURAL *Chemicals*

"What's in the Bag?"
film previewed
at
NPFI
June 10-13

This Month's Cover

Four pictures from the NPFI film "Whats in the Bag" to be previewed at the annual conference at White Sulphur, W. Va., June 10-13. See p. 43.

(1) Heavy and expensive machinery is used in phosphate refining.

(2) Stripping natural phosphate.

(3) Water jets convert phosphate deposits into a slurry for further handling.

(4) Processing nitrogen, phosphate and potash into mixed fertilizers.

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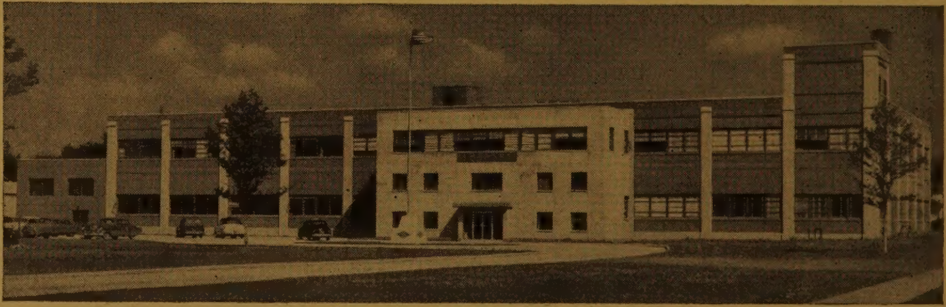

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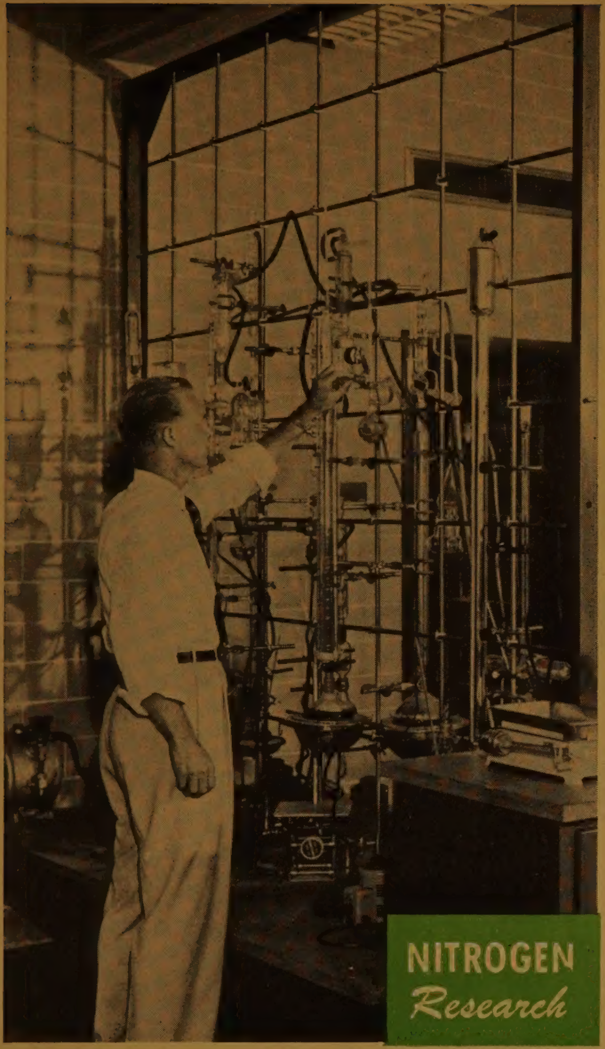

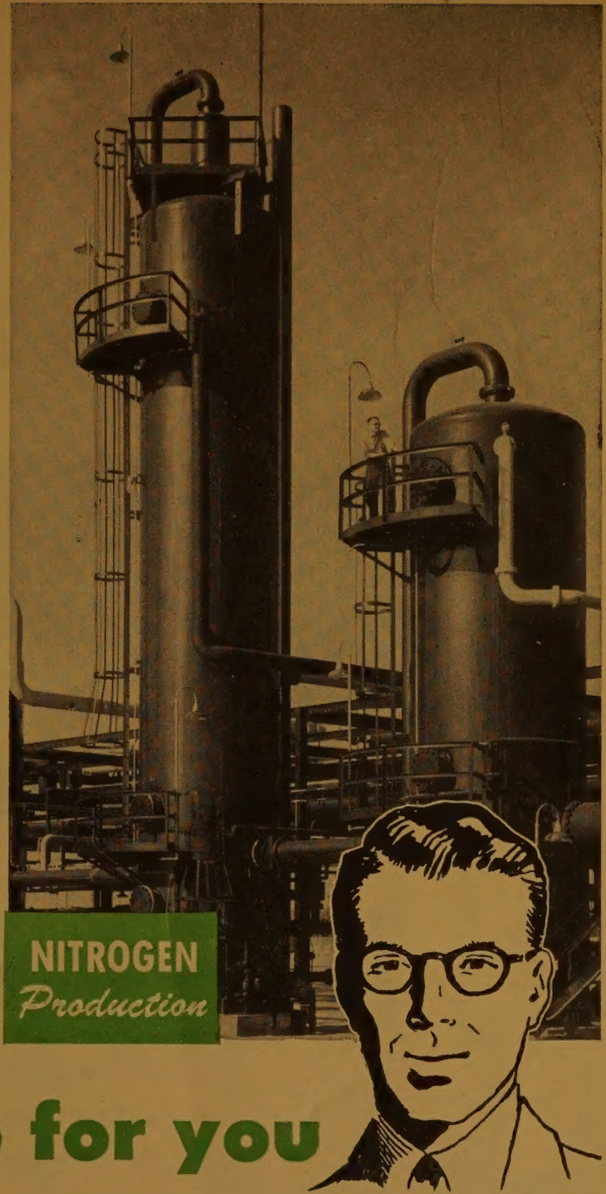

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In the Spotlight this Month

1956 Pesticide Situation . . . Pesticide industry reports that business was better in '55 than in any year since 1951. Current estimates indicate an even bigger pesticide usage in 1956. Page 37.

Recommending Chemicals . . . A spot check of county agents in all parts of the country shows that the county agent is an important influence on the buying habits of the American farmer. Page 52.

Superphosphate on Pastures . . . On calcareous soil and other conditions which might cause a quickly available phosphate to revert rapidly to less available forms, it is more effective to make small dressings at more frequent intervals; however, application cost must be considered in preparing this schedule. Page 64.

Spotted Alfalfa Aphid . . . Crop damage in 1955 totaled more than nine million dollars. Threat to 1956 is even greater, growers are cautioned. Page 44.

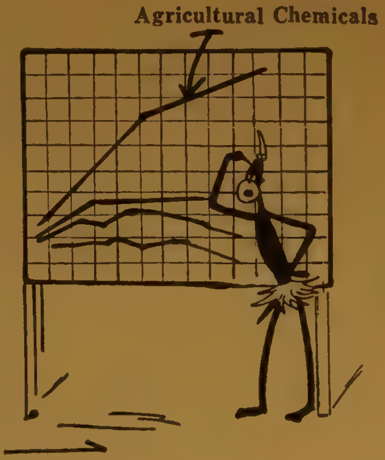
Insecticide-Fertilizer Mixtures . . . With the increasing demand for F-P mixtures, manufacturers are advised that instead of being concerned with what future changes may be made in the *type* of insecticides to be incorporated, it may be a definite advantage to purchase adequate and versatile equipment *now* to capitalize on any new F-P formulations which may be developed. Page 49.

Fungicide Tests . . . The third and final part of the 1955 fungicide test results is carried in this issue. A reprint containing complete results of the tests is available through Dr. Paul Newcombe. Page 56.

Mediterranean Fruit Fly . . . Outbreak of the Mediterranean fruit fly in Florida poses threat to citrus crop. Page 69 and 73.

NPFI Meeting . . . Discussions on how to sell the farmer, merchandising, etc., will highlight the annual meeting of the National Plant Food Institute. Page 43.

New Fertilizer Plant . . . A highly mechanized plant for the manufacture of granulated fertilizers recently went into full scale production for the Farm Bureau Cooperative Association at Mt. Gilead, Ohio. Page 34.



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You may be puzzled about what the stock market will do . . . but there can be no question about what magazine to read.

Agricultural Chemicals offers you some 60 editorial pages each month, devoted to the technical and practical developments of the agricultural chemicals industry . . . a balanced distribution of articles and news of interest to the manufacturer and distributor of insecticides, fertilizers, herbicides, etc.

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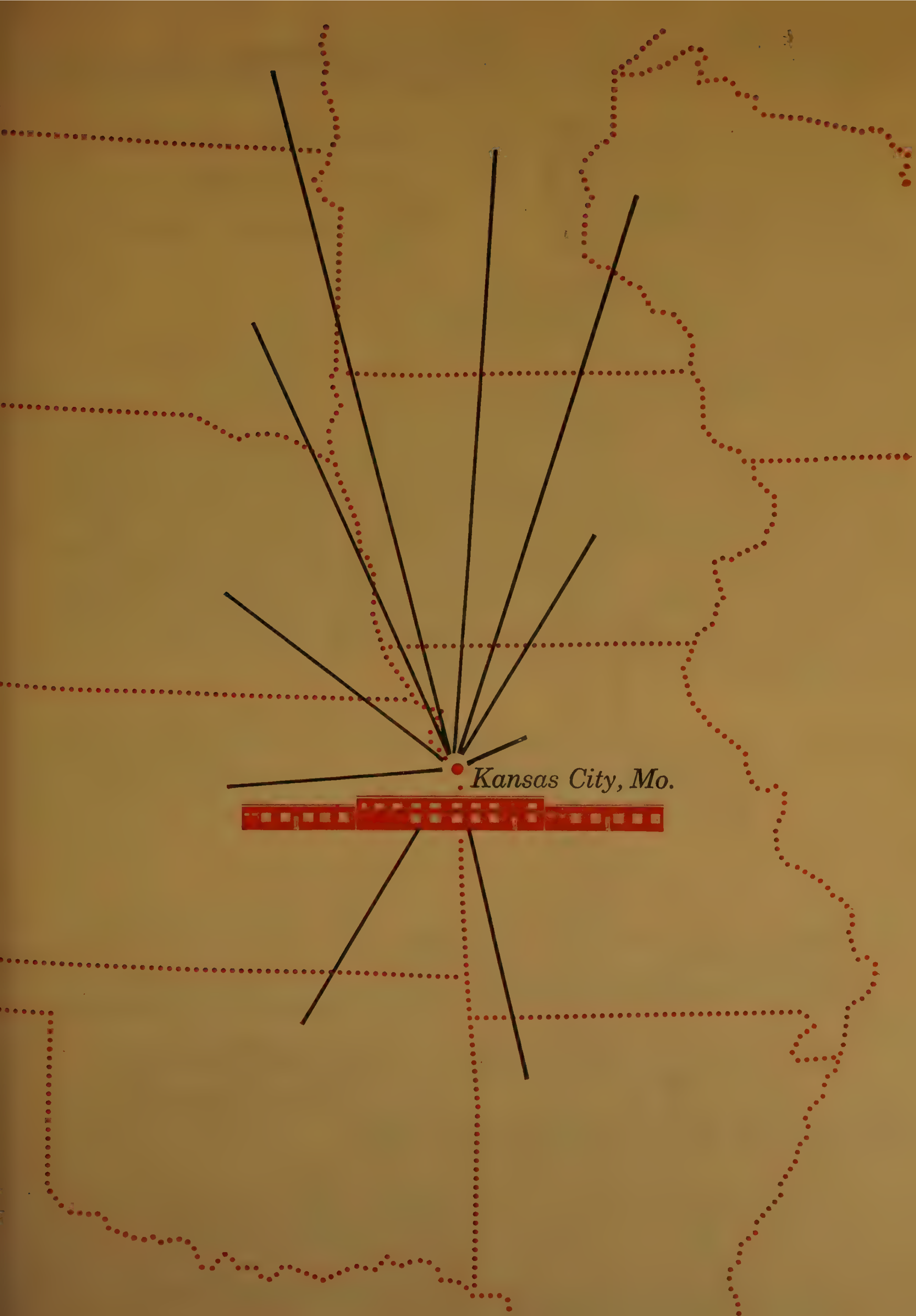
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"What we like about doing business with International is your service, particularly regarding delivery. Our material has always been shipped when requested."

Indiana

Your triple stores better

"Last September, we stored some of your triple next to competitive materials from two other suppliers. Six months later, the other two piles were set up hard enough to be blasted. Any lumps in your product could be broken with your fingers."

Minnesota

Your triple is a better product

"This is the best triple we have ever used for ammoniation."

Ontario

We get better ammoniation results

"We can put 600 lbs. of Urana 10 in with 1,400 lbs. of triple."

New York

Your Triple holds more nitrogen

"We have been amazed with the results. With a very high humidity we have been using 500 lbs. of nitrogen solution with 1,400 lbs. of your triple. Never before have we been able to get over 360 lbs. of this solution in the mix."

Maine

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"We like the constant high analysis of your product. It aids us in formulation and reduces the unit delivered cost."

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Arkansas

**names on request*

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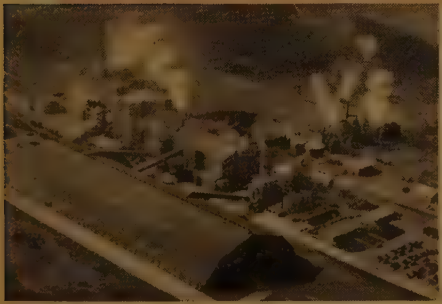

This 85,000-ton curing unit — as big as two, full-sized football fields — is one example of the time and big capacity needed to produce natural-cured triple.

These "doodads" and dials get results . . . guard the uniformity and quality of every batch of triple super from Bonnie . . . help assure you of top results in ammoniation.

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INTERNATIONAL MINERALS & CHEMICAL CORPORATION

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The double eagle twenty dollar gold piece illustrated was first coined in 1849.

AMONG formulators and distributors, PENNSALT chemicals are known for their dependable potency, high performance and constant quality. Our customers know that buying from PENNSALT, a basic producer, means speedy delivery of PENCO® brand agricultural chemicals from close-by plants or stocks and ability to satisfy. Our technical service is available to you. You'll do well when you depend on PENNSALT.

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Producing Chemicals for farm, home and industry for over 105 years

Pennsalt Chemicals

LOUISVILLE DRYERS are fitted to your job for faster, more efficient performance—lower cost in the long run!

FOLLOW-UP CHECKS AFTER INSTALLATION TO GUARANTEE MECHANICAL PERFECTION AND EFFICIENCY

LOUISVILLE METHOD

1. Initial survey and analysis of your particular problems.
2. Pre-testing in pilot-plant operation to assure performance.
3. Accurate design to meet your specific needs.
4. Top-quality fabrication in General American's own shops.

→ *5. Follow-up checks after installation to guarantee mechanical perfection and efficiency.*

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SALESMEN...
to help boost YOUR profits!

Beat the Cost-Price Squeeze!
each $1 properly invested in
LION AMMONIUM NITRATE
will return $3 to $4 on the average corn crop
LION AMMONIUM Nitrate FERTILIZER
LION OIL COMPANY
EL DORADO, ARKANSAS
Extra profits for you are
MIXED FERTILIZER
NPK

LION Advertisements Sell LION Nitrogen, *and* Your Mixed Goods, Too!

Continuous Lion advertising appears in leading farm publications, month-after-month, to pre-sell the Lion brand to farmers—and to sell the value of *your mixed fertilizers as well!*

Current advertisements are appearing in Farm and Ranch-Southern Agriculturist, Progressive Farmer, The Farmer, Nebraska Farmer, Kansas Farmer, Prairie Farmer, Wallace's Farmer & Iowa Homestead, Wisconsin Agriculturist and Farmer, Missouri Ruralist and Missouri Farmer. All of these advertisements are in color.

Each Lion advertisement promotes the economic benefits of properly using fertilizers, including Lion Ammonium Nitrate, to help increase the farmer's profits. Each advertisement sells *hard* on the importance of soil tests in the intelligent use of all commercial fertilizers. Lion, a leader in nitrogen production, leads the way to good fertilization practices . . . to better profits for you!

LION'S QUALITY LINE OF NITROGEN FERTILIZER MATERIALS

LION ANHYDROUS AMMONIA—82.2% nitrogen. Quality guaranteed.
LION AQUA AMMONIA—Ammonia content above 30%—other grades to suit your requirements.
LION AMMONIUM NITRATE FERTILIZER—Improved spherical pellets. Guaranteed 33.5% nitrogen.
LION NITROGEN FERTILIZER SOLUTIONS—Various types to suit your particular manufacturing needs.
LION SULPHATE OF AMMONIA—White, uniform, free-flowing crystals. Guaranteed 21% nitrogen.

LION OIL COMPANY

LION

A DIVISION OF MONSANTO
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DISTRICT SALES OFFICES: Lion Oil Building, El Dorado, Ark. • Insurance Exchange Building, Des Moines, Ia.
National Bank of Commerce Building, New Orleans, La. • 1401 Building, Atlanta, Ga.

DEPENDABLE, HIGH SPEED BAG CLOSING EQUIPMENT

Engineered

to meet modern

PRODUCTION REQUIREMENTS

NO two jobs are exactly alike—that's why Union Special builds a wide variety of bag closing equipment. In the Union Special line you will find machines for closing all sizes and kinds of bags from small textile or paper bags of one pound, or less, up to the largest multiwall paper bags in use today. Whether your production schedule calls for closing just a few bags or for high continuous output, Union Special can supply the equipment to do the work efficiently, economically, dependably!

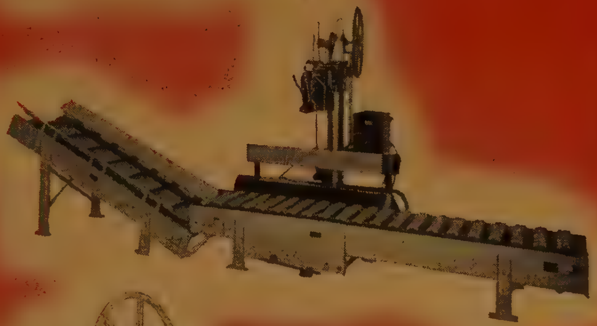
Coupled with a complete line of equipment is Union Special's vast background of experience and technical know-how that insures customers of getting THE RIGHT MACHINE FOR THE JOB!

Union Special representatives located in all leading industrial centers are qualified by experience and training to give you expert recommendations. Take advantage of the service they offer.

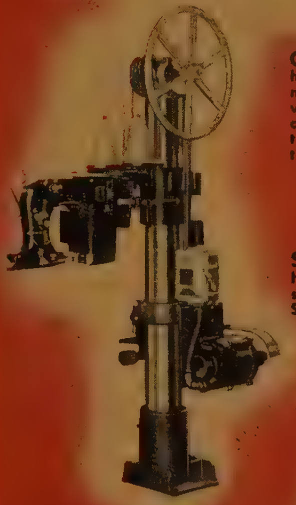
Ask for recommendations. UNION SPECIAL MACHINE CO., 447 North Franklin St., Chicago 10, Illinois.

Send for Bulletin 200

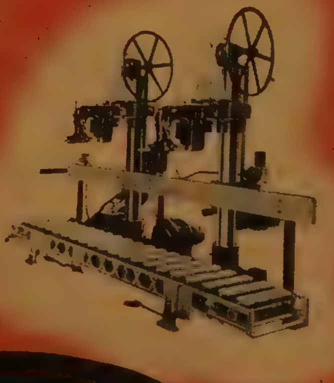
CLASS 21800 *(left)* for fast, economical closing of paper bags. Illustrated is Style 21800 H with 5 ft. conveyor and 80600 H sewing head for making tape bound closure. Tape is cut off automatically at each end of closure. Sewing head and conveyor adjustable vertically.



CLASS 20500 *(above)* machines are heavy duty, high production units for closing medium and heavy weight bags. Available with power-driven horizontal conveyor, inclined conveyor, or both; or with conveyor transmission unit only, for plant production line.



STYLE 20100 H *(left)*, is a heavy duty, high production column type machine designed for use with plant conveyor systems. Sewing head is pedal controlled.



DUPLEX MACHINES *(right)* are designed for closing double bags. The first sewing head closes the inner bag; the second closes either the outer bag alone, or both bags together for extra safety. Also recommended for single closures where continuous operation is a must—operator can instantly switch to other head.

Union Special®

BAG CLOSING MACHINES

MORE PRODUCTION WITH LESS EFFORT!

FOR ANY PROBLEM OF INSECTICIDE GRINDING

THIS versatile pulverizing unit provides a compact, economical installation which can be readily fitted to your plant layout in a minimum of floor space.

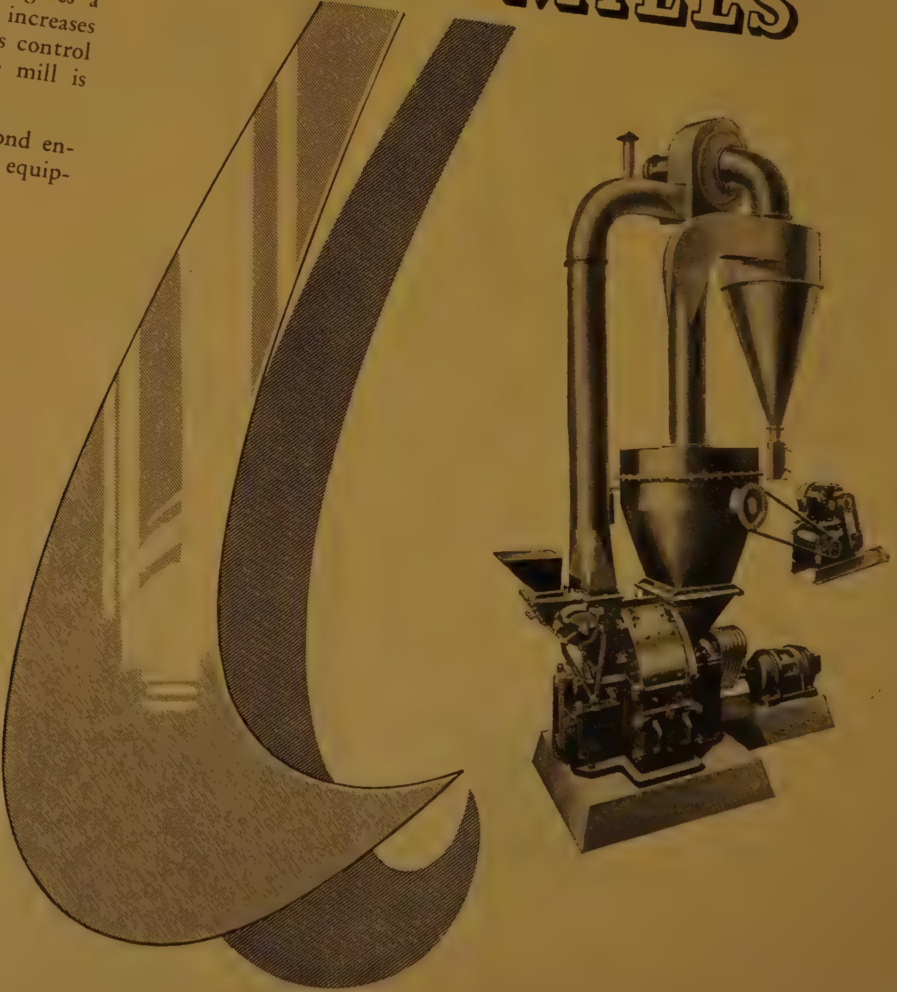
It does an outstanding job for producing blended field strength mixtures and many low concentrate formulations in a clean, dustless, automatic operation.

When the inert materials and insecticide are roughly mixed before being fed into the mill, the intensive mixing action of this machine will make a uniform product with an intimate, thorough blend.

The Whizzer Air Separator not only gives a wide range of classification, but also increases mill capacity and permits easy fineness control by one, simple adjustment while the mill is running.

Tell us your requirements—and Raymond engineers will advise you on the proper equipment to handle your problem.

RAYMOND IMP MILLS



For further details of Raymond insecticide grinding mills, refer to this Bulletin No. 68. Sent on request.

COMBUSTION ENGINEERING, INC.
Raymond Division

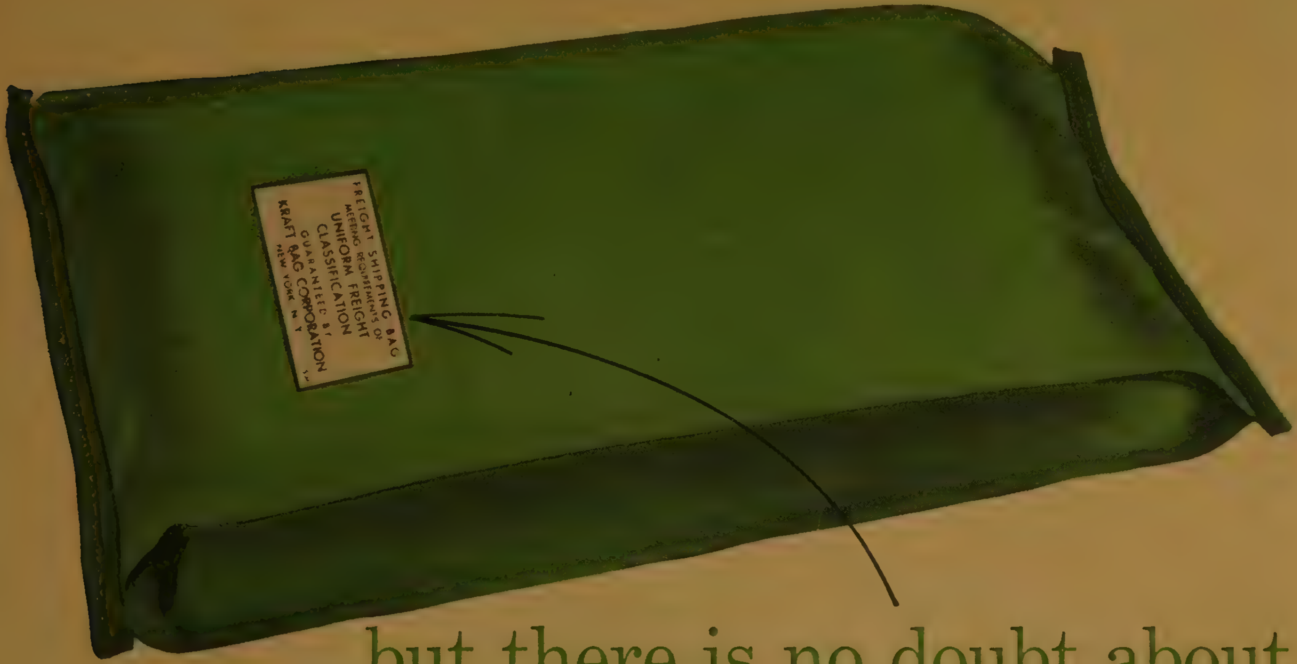
1314 NORTH BRANCH ST.
CHICAGO 22, ILLINOIS

SALES OFFICES IN
PRINCIPAL CITIES

Combustion Engineering-Superheater Ltd. Montreal, Canada

Cigars and Multiwall Bags

Kraft Bag Corporation, as a manufacturer of multiwall bags, is in the same position as the cigar manufacturer who complained that everything to be said about his 25c cigars had already been said about 5-centers!



...but there is no doubt about the quality of the multiwall bags that bear the Kraft Bag Corporation stamp!

Gilman
PAPER CO.
- St Marys Kraft Corp.
- Gummed Tape Div.
- The Cellulose Corp.
- Kraft Bag Corp.

Our completely integrated plants and modern facilities producing every type of heavy-duty valve or open mouth bag, are second to none!

As an exponent of true specialization, there isn't a single known or desirable time-and-labor-saving development that we haven't already either considered, initiated, adopted or built into multiwall bags we are called upon to make for America's industries, while continuing our search for still better ways to package our customers' products.

If your product can be packaged in a multiwall bag — you can depend on us to make the bag to fit your product.

Investigate
The KRAFTPACKER®
Open Mouth Bag Filling Machine for free-flowing material ... highest accuracy and production ... reduces packaging costs at an unbelievable rate.

KRAFT BAG CORPORATION

Gilman Paper Company Subsidiary
630 Fifth Avenue, New York 20, N. Y.
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Plants at St. Marys, Georgia and Gilman, Vermont

NEW TREND IN AMMONIA PLANTS

LUMMUS' 60 T/D UNIT FOR WESTVACO

One of the least expensive ammonia plants ever built went on stream in October 1955 at the South Charleston, West Virginia plant of the Westvaco Chlor-Alkali Division, Food Machinery and Chemical Corporation.

It is a small, automatic unit designed to operate with a labor force of two operators per shift, and produce 60 tons per day of anhydrous ammonia from waste chlorine cell hydrogen. Carefully designed and engineered for low investment and low operating costs, and incorporating all the latest safety features, the plant will have an unusually short payout time.

This small, minimum investment unit may well be the prototype for agricultural and industrial ammonia plants of the future. Because ammonia cannot be shipped over long distances, many such units, properly placed at hydrogen, natural gas, fuel oil and other sources throughout the country, would conveniently serve limited local areas.

Lummus built the plant around existing Westvaco facilities in an extremely confined area (as shown in the above photograph) without interrupting any normal plant operations, yet completed the job ahead of schedule in a brief seven months, with an excellent start-up. Westvaco was pleased with the job all along the line, from idea through operation.

This is one of four ammonia projects by Lummus in the last two years, and adds another to the 700-plus major installations completed by Lummus throughout the world.

May we work with you on your next project?

The Lummus Company, 385 Madison Avenue, New York 17, New York. *Engineering and Sales Offices:* New York, Houston, Montreal, London, Paris, The Hague, Bombay. *Sales Offices:* Chicago, Caracas. *Heat Exchanger Plant:* Honesdale, Pa. *Fabricated Piping Plant:* East Chicago, Ind.

LUMMUS

DESIGNING ENGINEERS AND CONSTRUCTORS FOR
THE PETROLEUM AND CHEMICAL INDUSTRIES

HAVE
YOU
SEEN
BHC
IN THIS
SHAPE?

Stauffer BHC Pellets Shown in Actual Size

You probably haven't! Stauffer BHC is the first to be marketed in pellet form. It's also the only BHC available in 24-gamma isomer. There's twice as much kill per pound.

Stauffer BHC pellets have solved your BHC grinding problem! Cold weather or hot, dry or humid, Stauffer pellets grind up like fertilizer. What's more . . . you get all you pay for: it doesn't stick to the box or cake in the corners.

Stauffer BHC pellets are easy to handle. They are virtually dust-free. Easy to store and measure.

Available for immediate shipment to all sections of the country. Write to us for complete information.

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CHEMICALS
SINCE 1885

STAUFFER
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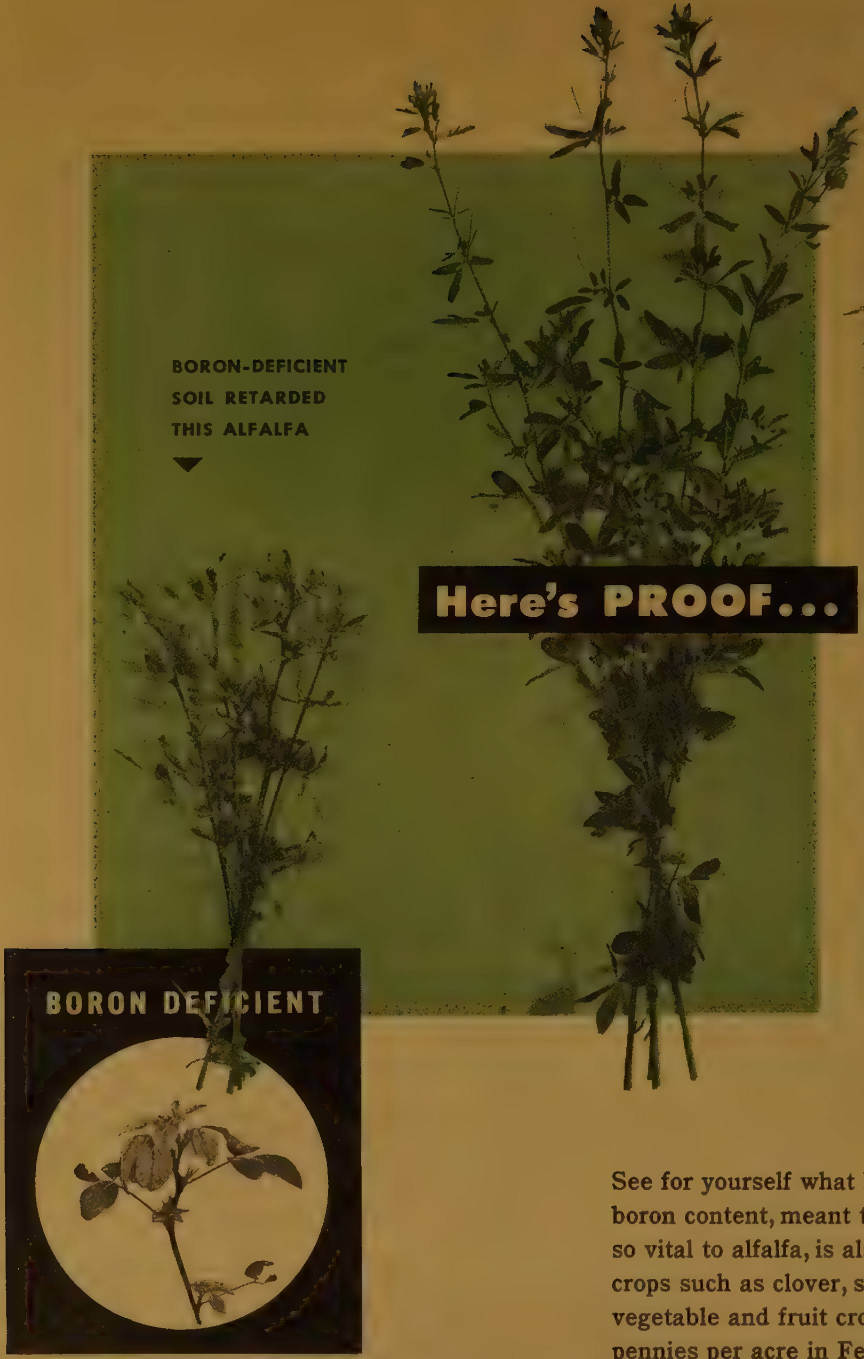
SAN FRANCISCO • OMAHA • LOS ANGELES
WESLACO • LUBBOCK • HARVEY
NO. LITTLE ROCK • TAMPA • NO. PORTLAND



Here's PROOF...

$1 to $2 spent on
Fertilizer Borate
(HIGH GRADE)
can give you an extra ton of Alfalfa hay per acre...

See for yourself what Fertilizer Borate, with its high boron content, meant to this alfalfa field. Boron, so vital to alfalfa, is also required by other field crops such as clover, sweet corn, tobacco...and most vegetable and fruit crops. This year, invest a few extra pennies per acre in Fertilizer Borate...the low-cost fertilizer grade of borax...to grow better crops!

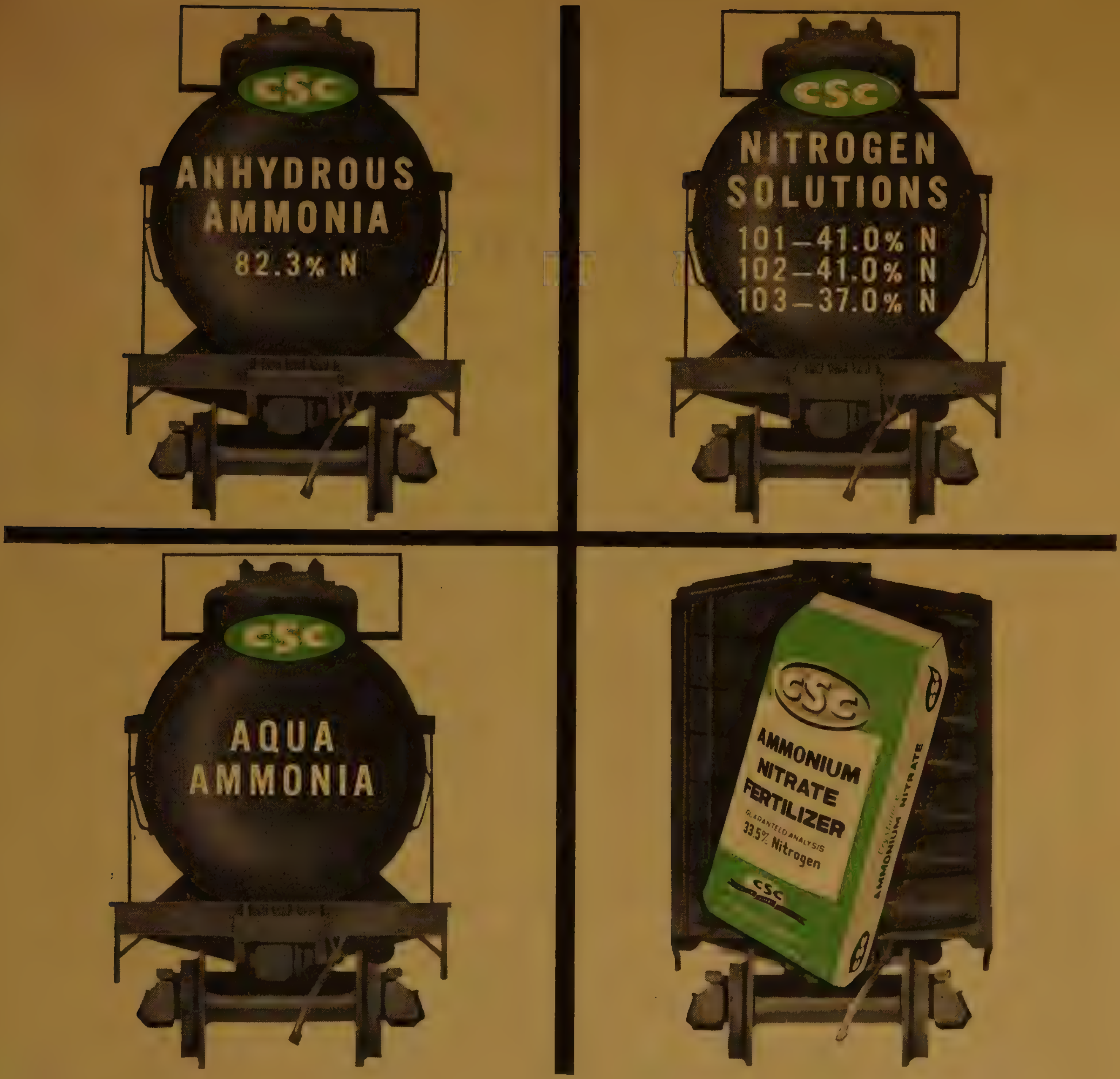
..... **Look for These Symptoms in Alfalfa:** Lack of boron causes plants to become puny and dwarfed. Look for yellow or reddened top leaves, stunted, with growing tips rosetted. See close-up photograph in circle for excellent example of boron-starved plant characteristics.

● *Fertilizer Manufacturers*— ***Here's Borax at the Lowest Cost per Unit...It's Fertilizer Borate-High Grade!***

This sodium borate concentrate, developed especially for the fertilizer trade, has higher analysis...approximately 121% borax equivalent. Choice of fine or coarse mesh. *Write for Bulletin PF-3!*

Los Angeles 5, California—630 Shatto Place
New York 17, New York—100 Park Avenue
Auburn, Alabama—1st National Bank Bldg.
Webster Groves, Missouri—P.O. Drawer 1
Portland, Oregon—1504 N.W. Johnson Street
Houston, Texas—924 Pioneer Amer. Ins. Bldg.
Calgary, Alta., Canada—2031 Fortieth Ave., S.W.

PACIFIC COAST BORAX CO.
DIVISION OF BORAX CONSOLIDATED, LIMITED
®
MANUFACTURERS OF FAMOUS "20 MULE TEAM" PACKAGE PRODUCTS



Four leading forms of Nitrogen

Commercial Solvents Corporation produces and supplies fertilizer manufacturers with four important forms of nitrogen. The three liquid forms are widely used for the preparation of high-analysis fertilizers and for the ammoniation of superphosphates. Exclusive, granular CSC Ammonium Nitrate fertilizer is distributed solely by fertilizer manufacturers. This high-quality, uniform product is manufactured at Sterlington, Louisiana. Adequate storage facilities assure prompt shipments and service. For complete information including Technical Data Sheets, write Agricultural Chemicals Department, Commercial Solvents Corporation, 260 Madison Avenue, New York 16, New York.

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260 MADISON AVENUE, NEW YORK 16, N. Y.

CSC
AGRICULTURAL
CHEMICALS

NITROGEN THE HEART OF THE HARVEST

DEFOLIATION
with spray or dust has now become
A COTTON "MUST"!

Yes, progressive cotton growers are defoliating before harvest — because defoliated cotton is *easier* to harvest, by hand or machine . . . grades higher at the gin . . . earns *extra* profits.

For this market, American Cyanamid Company produces *two* cotton defoliants — one a dust, one a spray — the choice depending on moisture conditions and grower preference.

AERO ® Cyanamid, Special Grade,
for dust application. The original and most widely recommended and used cotton defoliant. When moisture in the form of dew is present it acts like a natural, light frost dropping the leaves naturally . . . with no serious burning of leaves, bolls or stems.

3. A. T for defoliation and regrowth control.
A spray application which defoliates and—for first time—controls regrowth for 3-5 weeks. With the serious problem of regrowth solved, growers have more picking time — easier and efficient mechanical harvesting—green stain and trash reduced to minimum.

DISTRIBUTORS AND DEALERS: Make sure you get your share of the profitable cotton defoliation market — with Cyanamid and 3. A. T. Promotion leaflets and advertising mats available. For further information, write to . . .

CYANAMID

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AGRICULTURAL CHEMICALS DIVISION
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Producers of:

AERO® Cyanamid: Fertilizer — Defoliant — Herbicide
AEROPRILLS® Ammonium Nitrate Fertilizer
AERO® Ammonium Sulphate
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ANHYDROUS AMMONIA
AMINO TRIAZOLE, Weedkiller, and for Defoliation and Regrowth Control
PHOSPHATES for Acidulation and Direct Application
THIOPHOS® Parathion Technical
MALATHION Technical
THIMET® Insecticide
CYANOGAS® Calcium Cyanide Fumigants
HCN Fumigants
POTASSIUM CYANATE Weedkiller for Agriculture and Turf

*Trademark

Editorial COMMENTS

SPRING has perennially been the season when the fertilizer fakers take to the roads and "lawn spreads" are hawked off the back of a truck to the unwary home owner. But these fly-by-night purveyors of unanalyzed materials are not the only ones who feel they have earned the right to victimize the amateur fertilizer buyer. Newspapers, the radio, and more recently television have carried some mighty questionable fertilizer advertising over the past year or two.

New types of fertilizer materials are constantly being introduced for which certain advantages over conventional and time-tested products are regularly claimed. Exaggerated and highly questionable claims, for example, have been made for some of the water soluble fertilizers which have been marketed in recent years. Recently television programs around the New York area have been boosting a package lawn treatment which claims for some figure like five or six dollars to supply seed, fertilizer and soil pesticide sufficient to build a substantial square footage of grass. We predict there will be as many dissatisfied buyers as there are unhappy purchasers of aluminum storm windows.

A recent mailing by the extension service of the University of Vermont calls attention to this situation. Says Winston A. Way, Vermont extension agronomist, "Vermont homeowners are being hoodwinked by extravagant advertising of new 'miracle' lawn and garden plant promotion materials." He points out that while there are numerous new developments such as water soluble fertilizers, fertilizers which don't burn, etc., products exhibiting these properties are normally more costly than standard materials. He reminds that there is nothing too difficult about spreading a few bags of a regular dry material such as 5-10-10 and that the exercise which this affords the user will in all probability just do him good.

INSECTICIDE manufacturers were quite conscious of the fact that the 1955 season was a good one. Figures compiled by H. Shepard of USDA, and reported elsewhere in this issue (page 37), confirm that 1955 was the best year since 1951. Even more to the point, this expert in insecticide statistics forecasts an even bigger sales total for pesticide manufacturers and formulators in 1956.

The overwintering boll weevil population is of record proportions, and it is predicted that if weather conditions in June and July are favorable for the development of weevils, "large quantities of cotton insecticides are likely to be required in 1956." In addition, large scale aerial spraying will be continued this year to control spruce budworm; an accelerated program against the gypsy moth is contemplated; and with grasshoppers currently a worse threat to crops that at any time in recent years, heavy consumption of pesticides can be anticipated in this direction. Increasing efforts and larger quantities of pesticides will be needed also to meet the threat posed by pests like the spotted alfalfa aphid and the pea aphid, which have become of serious economic importance only with-

(*Turn to Page* 126)

A NEW PLANT IS BORN

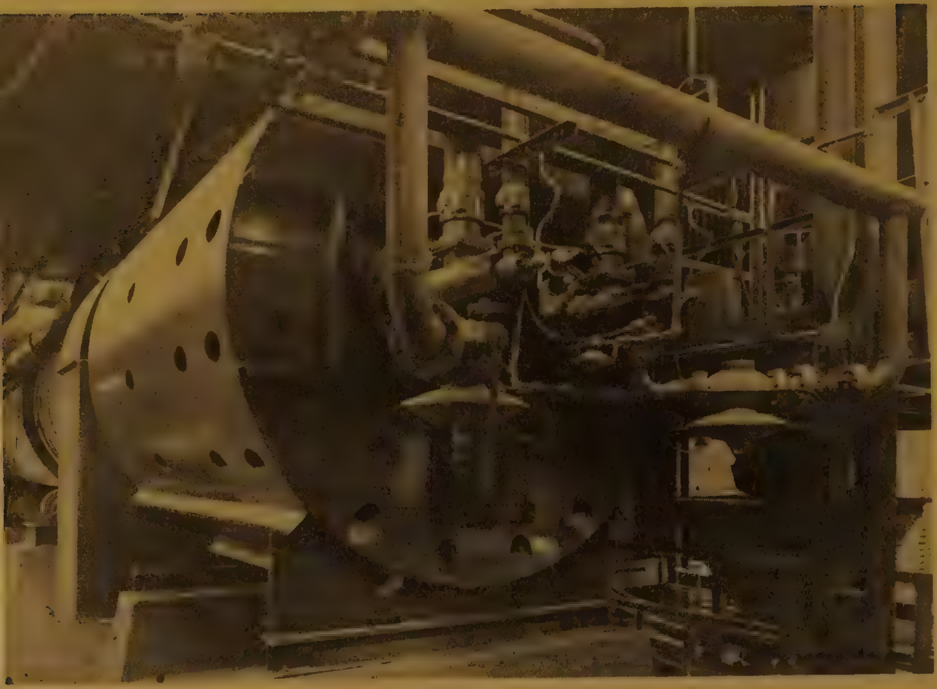
THE title of this article is borrowed from the unique construction sign (see upper left photo) used by the Sackett Company in announcing the erection of new fertilizer plants. In this particular instance, the plant is the one recently opened by The Farm Bureau Cooperative Association, Incorporated at Mt. Gilead, Ohio.

The host of innovations incorporated into this modern plant's production and materials handling facilities were planned with a keen awareness of existing high labor costs. All of the plant's operations, including the receiving of solid and liquid raw materials to process or to storage, the compounding, granulating and storing of product, as well as the bulk and packaged product shipping operations are accomplished at the highest attainable level of mechanization, resulting in a minimum of manual labor.

Its uncommonly high degree of flexibility and freedom from many of the usual manual operations permit all production activities to be carried on simultaneously and at high speed. Indeed, there are times during the normal operation of this plant when one can observe materials being handled and processed at rates well in excess of 200 tons per hour.

Two independently operated receiving units permit as many raw materials to be transferred from box cars directly to process. One of these units is also provided with an undertrack hopper for unloading hopper

- View of direct heat dryer and combustion chamber.



- Interior view shows materials storage bins.

• Exterior view of completed plant.

bottom cars. Both units are also equipped to take materials to storage bins, if desired.

The compounding and mixing equipment not only does a push-button job of weighing and blending the solid ingredients for direct delivery to the granulating process, but also provides management with a printed record showing the exact weight of each ingredient weighed through the process.

While a Sackett Continuous Granulating Process having a normal production capacity of 30 tons per

• Construction view showing upper portion of machinery tower.

hour has been provided, means have also been incorporated into the flow plan to permit continuous ammoniation and cooling of non-granular grades at a production rate of 60 tons per hour. Non nitrogen-bearing grades may also be produced at 60 tons per hour.

To insure maximum homogeneity in the finished granular grades, careful consideration was given, during the planning stage, to the preparation and classification of the solid materials blend prior to ammoniation and granulation. This required special screening equipment to be installed in the manufacturing phase preceding the compounding and blending operations.

After being accurately weighed from an elevated eight compartment hopper, the solid ingredients are thoroughly blended through a Sackett Gravity Mixer and conveyed to a continuous weighing machine. This machine supplies a closely controlled flow of the blended solid ingredients to a T.V.A. type continuous deep bed ammoniator, wherein the introduction and mixing of metered flows of anhydrous ammonia, ammoniating solution, sulphuric acid and water with the solid ingredients occurs. The ammoniator is provided with air blast and exhaust systems.

Front view of plant upon completion of steel erection.

Upon completion of the ammoniation phase, the material is discharged from the ammoniator to a T.V.A. type granulator. (Note - Plans have been completed for replacing this latter machine with a Sackett STAR* Granulator.) The ammoniator and granulator are each independently operated by variable speed drives.

Interior view showing portion of production equipment.

From the granulator the material is fed to a direct heat con-current type dryer which is provided with automatic controls, refractory lined combustion chamber and fired by two low pressure convertible type burners capable of using either gas or oil for fuel. The dried material then goes to a counter-current type cooler, thence to the final product classifying equipment. This equipment is provided with means for taking the product to storage bins or direct to one of the shipping units.

In this plant the products are packaged by four of the latest type valve packers, the movement of filled bags right onto the bed of the trucks being fully mechanized. Railroad cars may also be loaded for shipment with a minimum of labor.

Shipments of bulk products to exact weight specifications are made without the slightest interference with the shipment of packaged goods or with the manufacturing, granulating or receiving operations.

This new granular fertilizer manufacturing facility, which has a rated capacity of 70,000 tons annually, was designed, constructed and equipped by The A. J. Sackett and Sons Company of Baltimore, Maryland.

---

* U.S. and Foreign Patents Pending.

The Pesticide Picture . . . for 1955-56

Prepared by Harold H. Shepard, Commodity Stabilization Service, Food and Materials Requirements Division, U. S. Department of Agriculture, Washington, D. C. April, 1956.

SUPPLIES of insecticides, fungicides, and weed killers generally will be ample in 1956, as in the past year or two, for the needs of domestic agriculture (table 1). Users of these pesticides can avoid temporary or local shortages that may be due to distribution problems by placing orders as early as possible.

The pesticide industry reports that its business was better in 1955 than in any year since 1951. Conditions over extensive areas favored the development of heavy infestations of the boll weevil on cotton and rains made necessary many applications of cotton insecticides. In the Midwest, populations of grasshoppers and the European corn borer were serious. Extensive forested areas in the western United States were aerially sprayed in 1955 to control insect pests of timber, primarily spruce budworm.

The Miller amendment (Public Law 518) to the Food, Drug and Cosmetic Act, pertaining to the establishment of pesticide residue tolerances on raw agricultural commodities, is likely to promote the use of materials such as pyrethrum and rotenone which need no tolerance on food crops, or methoxychlor, malathion and captan which have a high margin of residue tolerance. On the other hand, many pesticidal chemicals with a lower margin of tolerance will still be recommended for application to food crops with only minor changes in directions for use made necessary by the new regulations.

In table 1 is shown the disappearance of major pesticidal chemicals at the producer level for each of the last three crop years and revised estimates of domestic requirements for 1955-56. Disappearance is calculated by applying to the production figure any inventory change taking place during the period and subtracting exports if these are known. Unfortunately, export data are often incomplete or unavailable; those for DDT reported by the Bureau of the Census include only preparations containing 25 percent or more of DDT, while no separate export figures are available for 2,4-D and 2,4,5-T. In estimating disappearance of the aldrin-chlordane group (chlorinated hydrocarbons) allowance has been made for exports by the primary producers, but exports by formulators and trading firms are not known. Estimates of requirements have been revised on the

Table 1.
Disappearance and requirements of some major pesticides by crop years, 1952-53 to 1955-56[1]

	Domestic disappearance at producers' level			Requirements for domestic consumption in 1955-56	
	1952-53	1953-54	1954-55	Minimum	Maximum
	1,000 lb.	1,000 lb.	1,000 lb.	1,000 lb.	1,000 lb.
Benzene hexachloride[2]	7,300[7]	8,500[7]	7,800	7,000	9,000
Calcium arsenate	7,000	3,190	3,823	8,000	12,000
Copper sulfate[3]	79,605	80,257	77,988	40,000	55,000
2,4-D (acid)[4]	26,634[7]	27,251[7]	29,000	25,000	28,000
DDT	62,500[7]	45,117	61,800	50,000	60,000
Lead arsenate	16,000	16,000	12,895	14,000	18,000
Parathion[4]	3,000	3,975	n.a.	3,500	5,000
Pyrethrum[5]	8,113	7,610	7,671	7,500	8,500
Rotenone[6]	4,468	6,428	5,954	6,000	7,000
2,4,5-T (acid)[4]	4,645[7]	2,906	2,500	2,500	3,500
Aldrin, chlordane, dieldrin, endrin, heptachlor, and toxaphene (combined)	34,050	35,420	57,000	35,000	50,000

[1] Based on available information; crop year is from October 1 to the following September 30.
[2] Gamma isomer basis; includes lindane.
[3] Disappearance for all domestic uses including industrial; requirements for agriculture only but include plant nutrient as well as fungicide use.
[4] Export data not being reported separately, figures represent total disappearance at producers' level.
[5] Revised imports; includes advanced in value (powdered), also equivalent of pyrethrum extract imported from Africa beginning in 1953-54.
[6] Imports; including cube and derris, both whole root and powdered.
[7] Revised figure.

basis of the latest statistics, trends over the past six years, and expected shifts in usage for the 1956 season.

U. S. production of some pesticidal chemicals as reported by government collecting agencies is shown in table 2. Production levels change according to the capacity of domestic and foreign trade to absorb the manufactured materials. Producers try to keep inventories at a level so that they can meet sudden demands, yet not incur excessive storage costs. The general inventory level indicated by the results of the annual survey of carryover stocks (table 3) appears to be about average. Indications of trends are based upon reports of firms that supplied figures in both the 1954 and the 1955 survey.

Exports of pesticides in 1955 were reported by the Bureau of the Census to have a value of $73,363,000, nearly $14,000,000 greater than for 1954. Mexico received 15.2 percent and Canada 11.6 percent of the exports in 1955. Preparations containing 25 percent or more of DDT made up 22 percent of the value of all U. S. exports of pesticides in 1955. Programs for the complete eradication of malaria in various foreign areas will require that large shipments of insecticides from the United States be continued at least for the next few years.

1954 Ag Chemical Consumption

COMPARED with other chemical materials used principally by agricultural growers, pesticide formulations as purchased by the consumer amount to only about one-thirtieth of the total tonnage of farm chemicals. An estimated breakdown of agricultural chemical consumption for 1954 is as follows:

Fertilizers	23,000,000 tons
Liming materials	19,000,000 "
Pesticides, formulated	1,500,000 "
Miscellaneous (feed supplements, etc.)	1,000,000 "
Total	44,500,000 tons

The survival rate of hibernating boll weevils in the Cotton Belt is generally high this season, according to state and federal surveys. In North Carolina, South Carolina, Georgia and Louisiana, the weevils are present this spring in numbers at least double those of a year ago. Many more weevils were turned up in woods trash in North Carolina than last spring but still well under the average of 2,422 per acre for the past seven years. In Florence County, South Carolina, surveys revealed 4,646 weevils per acre, more than twice the number found in the spring of 1955, while smaller samplings in six other South Carolina counties turned up 5,000 per acre, seven times as many as a year ago. The state average of surviving weevils in Georgia per acre of surface trash was eight times the number found last spring. In Mississippi ten or more counties averaged from 1,000 to 2,000 weevils per acre. In Madison Parish, Louisiana surveys showed the record-breaking average of 3,654 weevils per acre, 1.8 times as many as a year ago, and 4.3 times the 20-year average; in five other Louisiana parishes 3.6 times as many weevils were found present as last spring. *If weather conditions in June and July are favorable for the development of weevil populations, large quantities of cotton insecticides are likely to be required in 1956.*

Approximately 2,275,000 acres of timberland were sprayed from the air in 1955 by the U. S. Forest Service in cooperative projects. Most of this acreage was in Montana, New Mexico, Idaho, Washington and Oregon for spruce budworm control, using DDT at one pound per acre. In addition 450,000 trees were sprayed individually to control bark beetles. It is expected that in 1956 about 1,-

(Continued on Page 127)

Table 2.
U. S. production of some major pesticidal chemicals by calendar years, 1952-55

Chemical	1952	1953	1954	1955[1]
	1,000 lb.	1,000 lb.	1,000 lb.	1,000 lb.
Benzene hexachloride[2] (gross)	85,090	57,363	76,934	54,995
Benzene hexachloride[2]	12,800	8,800	11,500	10,161
Calcium arsenate	7,634	7,260	2,758	4,232
Copper naphthenate	13,680	3,268	3,557	[4]
Copper sulfate	189,072	145,888	130,616	156,176
2,4-D acid	30,718	25,928	30,184	34,070
2,4-D acid esters	21,108	18,826	16,994)	28,235
2,4-D acid salts[3]	3,933	4,836	5,642)	
DDT	99,929	84,366	97,198	125,134
Lead arsenate	14,286	14,196	15,620	14,776
Methyl bromide	4,620	6,167	[4]	[4]
Parathion	2,365	2,999	3,889	[4]
Phenothiazine	5,914	3,700	3,437	[4]
Sodium chlorate	80,868	86,442	75,644	93,226
2,4,5-T acid	3,490	5,281	2,697	2,887
2,4,5-T derivatives	3,138	5,386	3,883	[4]
Tetraethyl pyrophosphate (40% basis)	922	229	361	507
Ziram	934	1,152	1,117	[4]
Aldrin, chlordane, dieldrin, endrin, heptachlor, and toxaphene (combined production)	49,000	29,000	45,169	68,000

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[1] Preliminary.
[2] Not including lindane.
[3] Sodium and amine salts.
[4] Either not yet available or cannot be disclosed.
Sources: U. S. Tariff Commission; U. S. Bureau of the Census; U. S. Bureau of Mines.

The Effect of Government Controls on *Agricultural Output and Prices*

Based on an address by Earl L. Butz, Assistant Secretary of Agriculture, before the sixth annual session of the National Institute of Animal Agriculture, Purdue Univ., Lafayette, Ind., April 19, 1956.

AMERICA is a land of agricultural abundance. In the case of some of our farm products, as a matter of fact, we occasionally seem to have "too much plenty." Indeed abundance has become one of our major problems in agriculture.

Yet it must be said that, burdensome and price depressing as our farm surpluses may be, it is far more pleasant to wrestle with the problem of surplus than with the problem of not enough. We are fortunate that in the United States we have an agriculture so productive and so versatile that no American need go to bed hungry. Although our problems of surplus are perplexing and complex, they are far more welcome than the problems of chronic shortage, hunger and starvation.

From our early colonial history to the present, our Government has encouraged increased agricultural production, ranging all the way from free seeds to public supported research and to price guarantees at incentive levels. From time to time, too, we have tried to discourage farm production through various types of acreage and marketing controls. Our programs have often conflicted in purpose. At the very time attempts were being made to discourage production on the one hand, our long-term efforts to increase output continued unabated.

On the whole, the impact of these governmental programs on agriculture has been good. We have increased our total agricultural output in the decade and one-half since the beginning of World War II by some 35%, on roughly the same acres we had previously, and with substantially fewer workers. The bulk of the expansion and the increased efficiency resulted from the rapid adoption of new technological and scientific developments: new varieties, disease control, increased use of more efficient insecticides, antibiotics, mechanization, improved plant food practices, nutritive developments, and a whole host of other advances.

The important effect of these developments has been to make acres of land, in and of themselves, a relatively less important factor in production. Indeed, in recent years, it has been possible increasingly to substitute capital for labor and land. This has had two results. In the first place, guaranteed unit prices at incentive levels have called forth greater production responses than had been indicated by historical production records. Second, efforts to curb production by acreage limitation have had less than the anticipated effect because acres in themselves are no longer the most important single factor in production. Indeed cash payments made to farmers for acreage limitations have often been used to increase production on remaining acres through superior growing practices.

Price fixing is not new in America. The principle is as old as the colonies themselves. Only the form and the extent are new. We learned under the OPA of World War II that whenever we set the price of any commodity very far below its competitive level, we must also put controls on the demand side of the market. The result is rationing. We learned, too, that whenever we fix a price too high, we must impose controls on the supply side. Artificially high prices and rigid controls are the Siamese twins of agricultural policy. They cannot be separated, except in time of war, when an insatiable demand sops up surpluses.

High Supports Demand Controls

HIGH support prices develop surpluses on two counts: they discourage consumption and encourage increased production. When acreage allotments fail to do the job of limiting supply, more rigid marketing quotas necessarily follow. And effective curbs on production raise a myriad of questions. Shall efficient farmers be held back so as to provide a market at higher prices for the less efficient? Shall excess resources be retained in agriculture, when ample opportunity for their effective use is available outside agriculture? Shall top grade land be held idle while second grade land is given a production base? Can a central planning agency in Government, with its broad and uniform directives, get more efficient use of farm resources than would be true if well informed individual farmers made their own decisions? How do you provide for desirable geographic shifts in production areas for a particular crop? How can a beginning farmer acquire his "base" without taking over from Dad, or perhaps acquiring it with his bride, herself a daughter of a "base" owner?

Price Fixing Inefficient

When rigid price supports at incentive levels persist over any length of time, the resulting rigidity brings lowered effectiveness in the use of our resources. Fixed prices, whether ceiling prices or support prices, are essentially backward looking in their operation. Being fixed with reference to a historical base, it is difficult if not impossible to maintain the flexibility in fixed prices necessary to permit desirable adjustments to changing technology and shifting demand.

When some three million commercial farmers plan their production and marketing programs on the basis of their individual forecasts, inevitably some make wise decisions and some do not. But these errors tend to be compensating. The bulk of them make approximately the right decision, in line with what consumers desire most. Errors tend to be self-correcting. If the price of hogs is high relative to corn, for example, farmers produce more hogs. If prices are fixed by a Government agency, however, the farmer must try to forecast changes in Government edicts rather than to forecast changes in consumer demand and cost relationships. The former is much more difficult to predict than the latter. Administrative rulings are inherently not as flexible as open markets. Price administrators move slowly, and may discover belatedly that support levels are wrong. It takes still longer to admit such errors and correct them.

As a case in point, consider the current grain-livestock imbalance. Because the Government, through rigid price supports on a historical basis, has attempted to maintain historical price ratios between livestock and crops, grain has gone into Government storage instead of into animal production, and the Government now owns or has loans on over one billion bushels of wheat and one billion bushels of corn. In the case of feed grains and to a lesser extent in the case of wheat, these products were channeled into Government warehouses rather than into animal products, primarily because of the lag in the adjustment of price ratios inherent in Governmental price fixing.

There are other important and undesirable consequences of this system of uneconomic price manipulation which we should note. It stimulated excess production abroad as well as at home. It encouraged substitute products to rob our markets both in this country and in other lands. It helped destroy our export outlets, as expanded production abroad robbed us of traditional markets. It even attracted foreign production to our shores to compete with domestic output. These things together brought upon our farmers the most stringent production and marketing controls in the history of American agriculture.

These controls are unpalatable to us in Government, just as they are to the men who operate our farms and our marketing institutions. They are the undesirable product of an uneconomic system of price manipulation. These irritating and uneconomic controls are the inevitable aftermath of a price support system conceived in short-run politics. They portray the futility of seeking solutions in expediency rather than in integrity.

As a result of the increasing stringency of the controls which necessarily accompany price support programs such as we have had, producers of our basic crops have been cut back on production quotas to the point where many of them have nearly been forced out of business. Midwestern corn growers, for example, if they were to comply with their acreage allotments in 1956, would in many cases find it difficult to have sufficient volume to operate efficiently.

Burley tobacco provides an excellent illustration of where you ultimately get with production controls. Last year, of a total of 317,000 burley tobacco farms in the U.S., more than 60 per cent were at minimum level—five-tenths of an acre. It is admittedly impossible to make any kind of decent living on an allotment that size. As a matter of fact, there is no Government program that can provide a decent living for a family on a tobacco allotment of less than one acre, a cotton allotment of four acres, a wheat allotment so small that necessary equipment can't be used efficiently, or a corn allotment cut down to the size that the rigid price support program would impose upon midwestern farmers.

Few, if any, agricultural commodity groups have ever expanded after accepting the "favor" of Government high price supports, and the necessary production and marketing controls which follow. Government production and marketing controls are essentially backward looking—not forward looking. Producers with above-average managerial capacity and ambition are severely limited in what they can do. They suffer, consumers suffer, and all America suffers.

The method by which farmers can make their own adjustments is clearly illustrated by what has been happening in the hog market. Last winter there was much politically inspired pressure for the Government to place a price floor under live hogs. The pressure was resisted and a route chosen that would bring temporary

(Continued on Page 133)

Panel Discussions on Residue Tolerances and Status of New Pesticides Featured at Annual Meeting of WACA, Held May 15

"THE Experimental Status of New Pesticides," and "Toxic Residue Tolerances for the Chemical Industry" were the major themes of discussion at the Western Agricultural Chemicals Association annual spring meeting, held May 15, at the Hotel Clark, Los Angeles.

Some 125 members and guests who attended the convention were advised by Allen B. Lemmon, chief of the Bureau of Chemistry, California Department of Agriculture, that, "The $64,000 question for the chemical industry is how to use pesticides in maximum quantities, close enough to harvest to be completely effective against pests, and not leave excessive residues."

Added Mr. Lemmon, "Your industry has until July 22 to get in your requests for tolerances to the Food & Drug Administration. The agricultural chemical industry should do this for each chemical."

A panel of eight members of the University of California College of Agriculture discussed recent experimental work with pesticides, herbicides, and fungicides. Panel members included R. L. Metcalf, Entomologist; J. Ed. Swift, entomologist; R. C. Baines, nematologist; William Moje, chemist; James Kendrick, pathologist; B. E. Day, pathologist; and C. A. Fleschner, entomologist.

Said R. L. Metcalf, "Our work at Berkeley and Davis with new agricultural chemicals is getting rougher all the time. Competition is getting stiffer, and we feel that research on seed protection deserves special help. We are also giving particular attention to studies on sprays with short and long-lived residual action." Dr. Metcalf further indicated that the experiments at the California station involve a variety of chemical materials, and that the Miller law has presented no particular problem in this respect.

J. Ed Swift, Berkeley, said that the University of California has offered W.A.C.A. members experimental results on some 220 of the newer pesticides. The data covers test results on vegetables, fruit crops, nuts, berries, melons, potatoes etc., classifying results all the way from "excellent pest control" to "inadequate" and "poor."

Said Mr. Swift, "the pesticide recommendations are based on the experiments made by University of California departments of pathology and entomology." In general, he reported, 1955 work with pesticide sprays has been very successful. Where chemicals were found inadequate, it was often found that the spraying equipment was at fault.

"In seed treatment work," continued Mr. Swift, "we have had some trouble with germination after use of chemical treatments. In this respect, we have a great deal to learn, and we expect a great deal from these chemical products."

Panel speaker R. C. Baines, nematologist, said that in his work in nematode control, Fumarin and Nemagon have given satisfactory protection, killing the pests to a depth of 4 to 6 feet. In heavy clay soils, he said, the nematodes were killed only in the top 2 feet. Too heavy applications of Fumarin and Nemagon to citrus said Baines, caused injury to the trees.

Vapam, he reported, was found to be water soluble, very good as a fungicide, and a fair herbicide. Its use in irrigation water proved satisfactory for nematode control where 5 to 10 inches of water were used. On the other hand, Vapam proved toxic to all crops.

William Moje, chemist, announced that, "Soil fumigation for control of nematodes in old California citrus soils is becoming a common practice. When a citrus grove became unproductive, said Mr. Moje, "it had been a general practice to root out the trees, treat the soil to kill nematodes, then plant new young tree stock. We are seeking ways, he advised, to treat the soil without destroying the trees, and hope to find a successful compound even better for this purpose than any now in use."

Highlights in the report by Dr. James Kendrick centered on newly developed fungicides for plant pathology, and the prevention of blue and green mold causing citrus fruit decay. We need to know more, he said, about how to handle fungicides — since many of them are quite toxic and break down rapidly.

Antibiotics, according to Dr. Kendrick, are a promising development in plant pathology, and among other hopeful experiments are the tests with chemotherapeutants. We have hopes that these will work against root diseases.

We have many new materials in the field of weed control, said speaker

Some of the speakers at the May 15th WACA meeting: (l. to r) W. W. Jones, horticulturist; C. A. Freschner, entomologist; R. C. Baines, plant nematologist; and B. E. Day, plant pathologist.

B. E. Day, pathologist. "Our screening program proceed like this — we spar around searching for a new molecule that will be extremely selective as well as effective. Then our chemists screen these and develop the most promising. Among recent herbicide developments showing particular possibilities is trichlorobenzoic acid. Another group of herbicides discussed by Mr. Day and reported to show great promise is the "urea" group. We have worked on and screened over 400 of these compounds, he said, and expect to develop more.

"Neburon," said Mr. Day, is a good new urea herbicide. It has a low solubility, is not a systemic, and is good for seedlings. The ureas, he advised, open new horizons for orchard and vineyard use.

Horticulturist W. W. Jones, continued the discussion of urea herbicides, observing that they are a marvelous source of nitrogen for citrus trees, used either in the soil or as a foliage spray. We find we can supply the tree's total nitrogen needs via leaf spraying.

"The main trouble in the urea treatment," said Mr. Jones, "is the presence of a toxic material, Biuret, which is injurious to plants. Over a quarter of one percent of Biuret in urea injures plants. Overcoming this toxic element is currently under study.

Mr. Jones said that during 1955, some difficulty was encountered in use of 2,4-D sprays on citrus trees. We traced this trouble back to use of low volatile 2,4-D sprays which, he said, persist and upset the metabolism of the trees . . . killing many.

The program was concluded with the screening of a 30 minute color film produced and directed by Dr. C. A. Fleschner, entomologist, of the Riverdale Citrus Experiment Station. "Natural enemies of insect pests" showed graphically how beneficial insects cleaned out scourges of pests like red spiders, cottony-cushion etc. "In our work," explained Dr. Fleschner, "we endeavor to develop chemical sprays that will run the least danger of wiping out beneficial insects."

C-VPFA Protests Pricing Practices

AT its annual spring meeting, held May 7-9 at Myrtle Beach, S.C., The Carolinas-Virginia Pesticide Formulators' Association discussed commercial pricing practices involving basic raw material producers and the Carolina-Virginia formulators and resolved that the association "protest price inequities and request an investigation of such practices by proper authorities.

The actual resolution approved unanimously by the voting membership is as follows:

> "Whereas: it is evident that certain advantages are not being extended to the members of this association by certain producers of basic raw materials, and
>
> "Whereas: substantial discounts are enjoyed by certain firms producing finished products from the same basic chemicals, and
>
> "Whereas: the firms enjoying these discounts are, for all practical purposes, competing with members of this association in the same territories, at the same trade levels, with materials containing the same technical ingredients, now
>
> **Therefore: be it resolved that this association vigorously protest these price inequities and forthwith request an investigation of such practices by proper authorities."**

The announcement of the resolution followed a closed business session, and did not name suppliers accused of unfair pricing policies.

Other discussion at the meeting dealt with training and educating dealers, the factors involved in developing new chemicals, and a review of sound accounting practices. In the course of the business meetings, George Simches, Planters Chemical Corp., was appointed to fill out the unexpired term of vice president vacated by J. B. Maddrey, also of Planters, who resigned because of ill health. W. P. Crown, Carolina Chemicals, Inc., is president of the association, J. Myron Maxwell of Maxwell Insecticides, is vice president, and W. R. Peele, W. R. Peele Co., is secretary-treasurer.

In a review of the research and screening involved in developing a new chemical, Kenneth R. Holden, Chemagro Corp., Orlando, Fla., reported that nearly five years are usually required to put a chemical on the market. The variables involved in producing a pesticidal chemical are almost infinite, he said, even after it has been established that a given compound has properties of insecticidal, fungicidal or herbicidal activity. Some of the questions to be considered are: whether the product can be made in a pilot plant in less than commercial quantities; will it possibly harm the plant while killing pests; can it be produced economically, so that it can compete pricewise against existing compounds; is the material a systemic, a contact insecticide, or a stomach poison; etc. One of the most important steps, observed Mr. Holden, in producing an insecticidal product, is the formulation . . . since this can "make or break" a given material. In the development of a new product, it is important to consider whether ordinary formulation processes might be readily applicable to its production.

Theodore Riedeburg, Riedeburg & Associates described some of the newer developments in emulsifiers which permit the incorporation of various insecticides in complete liquid fertilizers. He observed that the use of liquid insecticide-fertilizer mixtures is increasing, and offers greater sales possibilities to formulators in the Carolinas and Virginia.

The importance of training and educating the dealers who handle the products of the pesticide industry was reveiewed by I. D. Carter, Esso Standard Oil Co., who remarked that labels on various products are sometimes too confusing for a layman to fully comprehend, and that a greater effort should be made to "educate" the dealer, who is invariably questioned by the layman-buyer.

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June 10, Sunday

Registration
Ladies Garden Party
Meetings of the Executive Committee and Board of Directors

June 11, Monday

Presiding: **J. A. Howell,** president of NPFI
"One Year of Service," **Russell Coleman,** executive vice-president, NPFI
"Who Influences the Farmer," Drs. **J. M. Bohlen and G. M. Beal,** associate professors of rural sociology, Iowa State College
"Dramatize Your Selling," **Glenn R. Fouche,** president, Stayform Co., Chicago
Business Meeting: Research and Education Committee
Hospitality Hour, courtesy of Nitrogen Producers

June 12, Tuesday

Presiding: **J. A. Howell,** president of NPFI
"What's in the Bag?", premiere showing of NPFI movie
"Soil Builders Award for Editors," presentation of Institute's annual award by **Louis H. Wilson,** secretary and director of information
"Seeing Plants Feed," a film presentation by **John Ott,** John Ott Pictures, Inc., Winnetka, Ill.
"Our Nation's Role in World Tension," **Senator J. W. Fulbright** (D.-Ark.)
Memorial Resolution, presented by **Hugo Riemer,** New York City
Business Meeting
Hospitality Hour, courtesy of the Potash Producers
Banquet

DISCUSSIONS on merchandising, plant nutrition, and selling the farmer, will highlight the annual convention of the National Plant Food Institute at the Greenbrier, White Sulphur Springs, West Virginia, June 10-13. More than 1000 persons, representing fertilizer manufacturers, material producers, and others are expected at the meetings, which feature as speakers prominent leaders in government, industry and agricultural communications.

Senator J. W. Fulbright (D.-Ark.) chairman of the Senate committee on banking and currency will give the principal address on June 12th, discussing "Our Nation's Role in World Tension." Drs. J. M. Bohlen and G. M. Beal, Iowa State College, will give a visual demonstration on "Who Influences the Farmer," and Glenn R. Fouche, Stayform Co., will speak on "Dramatize Your Selling."

The Institute's annual business meeting will be held on June 12th, and will be preceded by a Memorial Resolution presented by Hugo Riemer, chairman of the Memorial Committee.

National Plant Food Institute

Emphasizes farm role at annual meeting at White Sulphur, W. Va. June 10-13

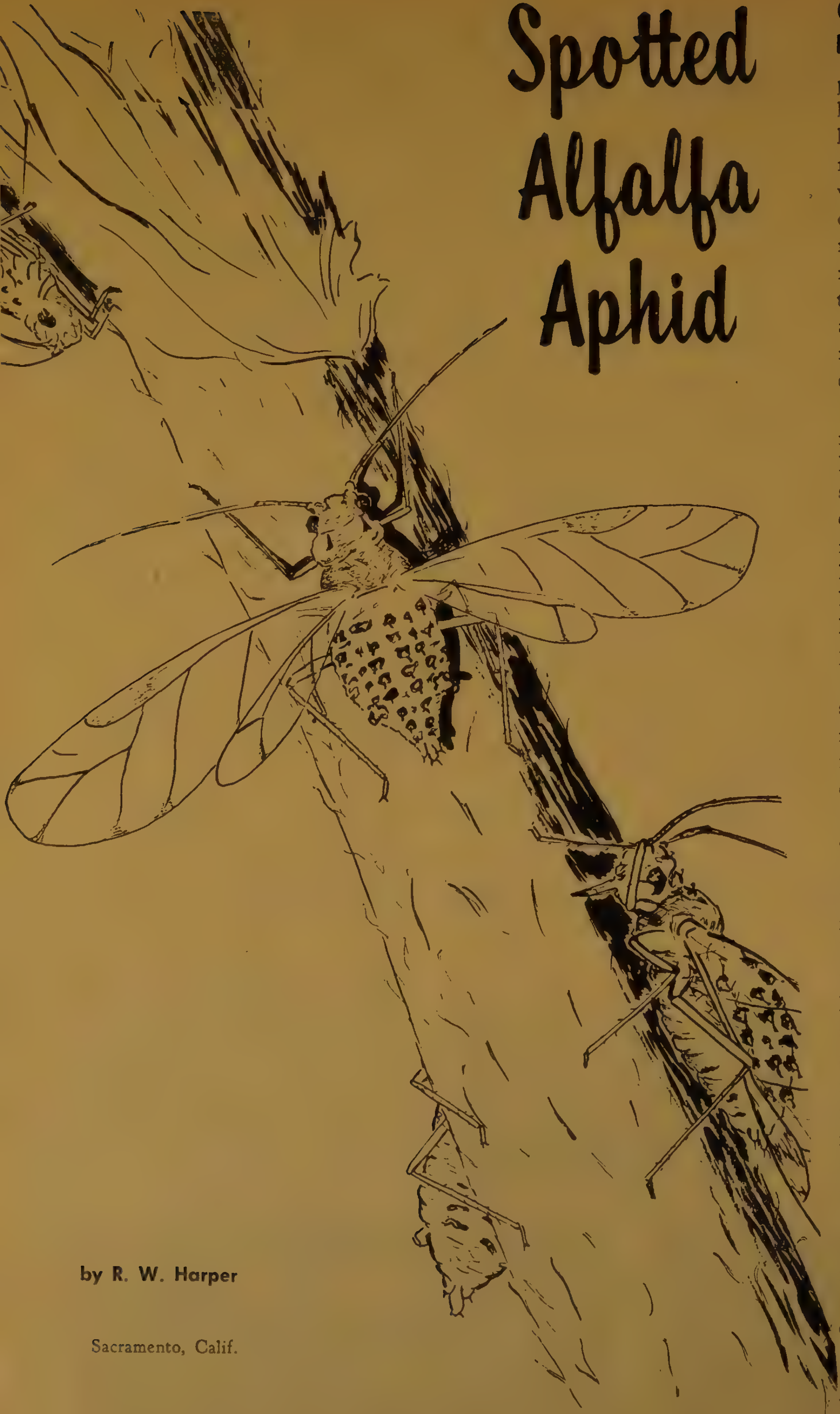
Sen. S. W. Fulbright →
Dem. Arkansas

← **Glenn R. Fouche**
Stayform Co.

George M. Beal, left, and J. Bohlen, both of Iowa State College will make a visual presentation on the results of a survey on "Who Influences the Farmer."

Mr. John Ott, right, photographer, will present two photographic stories on "Watching Flowers Grow," and "Seeing Plants Feed" at the NPFI Meeting.

Spotted Alfalfa Aphid



by R. W. Harper

Sacramento, Calif.

SINCE 1954 the spotted alfalfa aphid, *Therioaphis maculata*, has exploded over alfalfa plantings from California to Oklahoma and from Mexico into Nebraska. Of apparent foreign origin, its insertion into the American scene without the accompanying natural control factors that have rendered it of minor economic significance in its home area, the pest has and continues to threaten the production of alfalfa in the United States as has no other single insect in recorded entomological history.

The species is widely distributed in Asia, the Near East and in the Mediterranean area. Native parasites, predators and other limiting environmental effects have tended to resirict its destructiveness in these lands to such an extent that it has been of recorded pest status there only locally and intermittently, over the past twenty years.

An example of its phenomenal spread and severity of attack may be illustrated by developments in California. First found there in southern desert areas during the spring of 1954, the aphid had moved more than 600 miles northward by the fall of 1955, infesting to some degree nearly three-quarters of the more than one million acres of alfalfa in the state. Nearly one and one-half million acre treatments, representing a four million dollar control investment, were applied during 1955 in combating its attack. Despite this control attention, it is estimated that crop losses totaled more than nine million dollars. Treatment requirements and host damage were proportionate in other generally infested areas.

Winged females are highly mobile, strong fliers and may be carried many miles by the upper wind currents. Movement of green cut hay or contaminated vehicles and equipment have undoubtedly contributed to further spread. Roadside and ditchbank volunteer alfalfa, permanent pasture mixes with alfalfa a component part, rangeland bur clover stands and other native host situations create natural channels inviting establishment and further spread.

Aphids feed on the undersides of the leaves, initially in the lower portions of the plant. Plant juices are removed and toxic digestive substances injected in the feeding process. Leaves dry and fall and eventually entire plants may be killed out. Seedling stands are particularly susceptible, only a few aphids per plant being capable of rapidly wiping out entire plantings. Quantities of honeydew are exuded over the host plant and in this media, black sotty mold fungi develop. Heavy deposits of honeydew and mold interfere with harvesting and baling operations, lower the quality of the hay and impair the palatability of the feed. Heavily infested hay is of lower protein content and of poorer color, further reducing the feed value and grade quality. Short of plant mortality, aphid attack results in reduction in general productivity due to loss of leaves, stunting of growth, slowing of regrowth rate and shortening of stand longevity.

Aphid attack varies both geographically and seasonally. Along the coast and in higher mountain areas it is apt to be of pest status only during the warmer summer months; in the interior valleys it presents a problem over a longer period, from spring into fall, with cold and wet winter months acting to depress its activity; and in desert areas it gains pest status only in spring and fall, both excessively high summer and cold winter temperatures serving to restrict its attack. Alfalfa is the favored host plant, while bur clover and medic are good hosts. Alsike, sour, crimson and berseem clovers are attacked to a lesser degree. Trefoil, vetch, hubam, ladino, red and white clovers are not susceptible.

Available controls for the spotted alfalfa aphid include cultural, chemical, biological, and resistant plant strain developments.

Good cultural planning and management in the production of alfalfa is imperative. The preparation of good seed beds, ample moisture and adequate fertility are essential to the development of the seedling plant to a less susceptible stage at the earliest possible moment. Regularity of care in connection with mature stands is also important; timed irrigations, regular cuttings, thorough mowings and destruction of volunteer plants all contribute to a healthy situation.

The spotted alfalfa aphid is readily killed by insecticidal applications, yet remains difficult to control due to its high reproductional capacity and its mobile habits which allow for reinfestation from adjacent untreated fields and missed borders or spots in the treated area. Thorough and properly timed treatments are essential to the economy and effectiveness of the control measures taken. Cooperative community effort is advocated where possible. In mature stands, treatments should be made when honeydew can be readily detected, when aphid populations are increasing and when cuttings are not imminent. Seedling fields should be treated as soon as aphids are readily detected.

Recommended chemicals include parathion at two to three ounces of actual material per acre by ground rig, three to four by air; malathion at eight to ten ounces by ground or ten to twelve by air; and systox at two to four ounces per acre. Dusts in equal proportions may be used but are not as effective as sprays. Federal tolerances under the Miller Act allow for one part per million residue on alfalfa hay in the case of parathion, and eight parts per million for malathion. No tolerance level on hay has been established for systox. Residue data indicates that these tolerances can be met if malathion is applied no later than seven days prior to cutting, parathion fourteen days and systox twenty-one days before harvest. TEPP, one pint of 20 percent material, leaves no residue but should be used with caution as it has, on occasions, injured foliage growth, particularly during hot weather. Seed treatment with some of the newer systemics shows promise in the protection of seedling stands, but this work is still in the research stages. To date, parathion has given the most consistent results in young plantings.

There are special problems in connection with control in heavily infested, honeydew contaminated hay or in blooming seed crops that have attracted or are the site of honey bee activity, for malathion, parathion and TEPP are highly toxic to this insect. This is also true of the treatment effects of these chemicals upon predator and parasite populations. In both cases systox, which has the least harmful effect, is recommended.

Native predators, including ladybird beetles, lacewings, pirate bugs and syrphid fly larvae have seasonally given effective biological control in some areas as has a fungus disease *Empusa aphid's*. Hymenopterous parasites of three genera, *Praon*, *Aphelinus* and *Trioxys* have been imported from Europe and Asia, mass reared and widespread releases made. Although all have been recovered from the field, indicating successful local establishment, it is yet too soon to evaluate their effectiveness there or to determine their persistence under all conditions.

Studies continue in the effort to develop alfalfa strains that are resistant to aphid attack. The variety Lahontan has proven itself highly resistant. A winter dormant type, this variety lends itself to use in areas where winter hardiness is desirable. In warmer zones, however, its yield is from five to 25 percent less than existing varieties such as Caliverde or California common. Through crossbreeding and selection it is hoped that varieties incorporating both high yield and resistance factors may be developed.

The spotted alfalfa aphid problem has been a serious one and will continue so, with expectation of further spread and need for chemical control over several millions of acres during the 1956 season. However, with the availability of effective insecticides, the progressive education of growers in the knowledge of the insect and the procedures of effective control including the full evaluation and utilization of cultural methods and native predator assistance, a more sound approach to the problem is at

(*Continued on Page 133*)

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the role of Organic Matter in crop growth

by V. Sauchelli
Davison Chemical Co.
Baltimore 2, Md.

JUST how important is organic matter in growing crops? How does it function in promoting growth? What is the relative importance of organic matter to the farmer as compared with chemical fertilizers? These and a host of allied questions are much in the farmer's mind; and the fertilizer salesman, the fertilizer dealer and distributor, should make sure he has the answers; that he understands and can intelligently explain the true role of organic materials in crop growth.

Unfortunately the whole subject of organics has been obscured and confused by the rather extreme beliefs of the organic cultists who accept organic materials as cure-alls, and couple their rabid belief in the efficacy of organics with a credo that chemical fertilizers are to be shunned. Such teaching, to be sure, has been based on mere theory and opinion, unsupported by adequate scientific evidence. This has not stopped the cultists, however, from loudly proclaiming their unsupported theories, and, as a result, much confusion exists, not only in the minds of the farmers, but in the minds of fertilizer dealers and distributors as well. It is important for those concerned with the sale of fertilizers to have a true picture of the whole subject firmly in mind so that, when questions arise, they can clearly and convincingly outline the true role of organics.

There is no question but that the addition of organic materials to soil results in substantial benefits. While organic matter as such is not absolutely essential to growth promotion (as witness the fact that plants can be grown in a nutrient solution in the complete absence of humus), it is an accepted fact that organic matter has an important indirect favorable effect upon plant growth through its influence on soil structure, enhancing the availability of air, water and nutrients in the root zone.

The essential needs of a growing plant are air, water, energy from sunlight, an adequate supply of the major nutrients (nitrogen, phosphorus, potassium, calcium, magnesium and sulfur) and at least a minimum available supply of the minor nutrients (iron, boron, copper, manganese, zinc, molybdenum, etc., some of which are occasionally deficient in certain soils).

Animal manures and soil organic material contain plant nutrients in varying quantities, but do not often represent an efficient or commercially practical means of supplying these essential materials. Because manures and other organic materials are in short supply for fertilizer purposes, these organic sources of nitrogen are normally too costly for use, except for the dairy farmer. In addition to their high cost, organic sources of nitrogen, because of their low nitrogen content, also are unsuited to the formulation of high-analysis fertilizers, which are preferred by many farmers today. And, while barnyard manure contains substantial amounts of nitrogen and potassium, its phosphorus content is relatively low; thus it must be considered an unbalanced fertilizer.

It should be kept in mind, too, that when a green cover crop is plowed under, it has no capacity to add to the mineral supply of the soil. The green crop, unless it be a legume, contains only such nutrients as were originally present in the soil. The legumes, of course, such as the clovers, alfalfa or lespedeza, have the capacity of taking nitrogen from the air and converting it into plant tissue. And in areas where grains fed to livestock are shipped in from other areas, the manures from animals fed on such imported grains can contribute substantial quantities of needed plant nutrients, and particularly any missing needed trace elements. The cover crop, however, as observed above, unless it is a legume, can add nothing to the mineral supply of the soil unless it is itself fertilized.

The most important function of the organics is to improve soil structure. Organic matter in the form of manures, straw, compost or green manure improves the structure or tilth of heavy clay soils when incorporated in them. It does this by aggregating the tiny soil particles into crumbs. Soil microbes present in the organic matter decompose the organic substances which ultimately are reduced to humus, a blackish, slimy material. Humus coats the silt and clay particles as a thin, sticky film and causes them to form aggregates of varying sizes. The net result is that the soil mass eventually takes on a crumb-like structure which facilitates the penetration of air and water throughout the mass. Such soil is more easily worked by the farmer. Since the organic matter promotes growth of soil organisms, fresh additions of it must be made frequently to sustain optimum population of worms and bacteria.

Animal manures, however, can be employed most efficiently only when adequately supplemented with plant nutrients derived from chemical fertilizers. Results obtained with a combination of manures and chemical fertilizers are much superior to those which result from employment of organics alone. The most efficient and economical method is to grow and turn under a fertilized cover crop. At Seabrook Farms, in New Jersey, where a 30,000 acre tract is devoted to production of market gardening crops, the system followed is to fertilize a grass-legume cover crop in the fall and turn it under the following spring prior to planting a cash crop. They have found the system to be practical and highly profitable; and under their conditions it is not necessary to build up the organic content of the soil above the level of one per cent for maintaining good soil structure and fertility.

The most economical and practical method for the average farmer to use to get the necessary quantity of organic matter into his soil, then, is to grow his own organic content in the form of a fertilized grass-legume cover crop. Assuming that at least one per cent of organic matter is needed in soil, this means having at least 20,000 lbs. per acre in the upper 6 inches of soil. This is a rather unwieldly and impractical amount to hope to apply from a fertilizer bag. The sound recommendation for the fertilizer salesman, dealer or distributor to make to his farmer customer is to use adequate quantities of commercial fertilizers along with sound soil management practices as an economical means of sustaining high crop yields.

A few specific suggestions may be in order to suit recommendations for different areas of the country.

Northeast

In the dairy, grassland region of the Northeast maintenance of a high level of soil organic matter is not difficult. Here dairy farming permits grass-legume sods to be grown and plowed under at some point in the usual crop rotation and the accumulation of barnyard manure enables the farmer to increase organic content by direct application. Adequate liming and application of mineral plant nutrients maintains the balance in fertility required for highest crop returns. However, on non-dairy farms of this region the same problems arise as elsewhere regarding the establishment and maintenance of supplies of organic matter in the soil. In this case also adequate liming and generous fertilization of cash crops coupled with sound management practices permit the accumulation of large quantities of organic matter in the form of roots and post-harvest crop residues which eventually become humus.

The South

Southern farmers have generally learned how to maintain adequate supplies of organic matter in their soils, particularly on tobacco and truck crop farms. Good rotations are used on most farms and these when associated with sound soil management practices provide adequate supplies of organic matter. A corn-wheat-clover rotation followed on silt loam soils can build up a 1.5 to 2.5% level of organic matter. A rye and crimson clover cover crop on sandy loams, fertilized at time of seeding and turned under the following spring, provides ample supplies of fresh material for conversion to humus. As mentioned previously, it is not economical to maintain a level of more than 1 to 2% organic matter in any of the coarser-textured soils. Burley tobacco growers rely upon manures as a source of organic matter.

Throughout the Deep South the problem of soil erosion is ever present, especially where row crops such as cotton, corn and tobacco are concerned. Keeping such land under cover throughout the year, insofar as possible, keeps erosion down to a minimum. For this purpose winter and summer legumes for plowing under have been beneficial and at the same time the practice tends to maintain a satisfactory level of organic matter in the soil. However, farmers are being made to realize that one of the best means for keeping erosion down and organic matter level up is to fertilize generously so as to get maximum production of the cash crops and a huge supply of crop residues for replenishing the soil organic matter.

Under Florida conditions of temperature, rainfall and soil types it is difficult to build up the organic matter beyond the 1 to 1.5% level: The organic matter decomposes very rapidly, and humus is not held long. Many virgin soils of this state have only 1 to 2% organic matter and consequently such soils have a small capacity for retaining applied plant nutrients. The capacity of a soil for holding moisture and nutrients is related to its content of humus and clay. Hence, it is easy to understand why so many sandy, coarse-textured soils of Florida have such small capacity to maintain a high level of fertility. The best that can be done is to replenish the organic matter every year with a fertilized green manure crop. Lupine, crotolaria and other legumes are being used for this purpose.

Corn Belt Soils

Many of the soils of the Corn Belt have a naturally high content of organic matter owing to the fact that such soils had been under grass for thousands of years prior to the era of cropping. However, records show that plowing and cropping this sod-land has caused a rapid decline in organic matter content, about 33% having been lost in 50 years of cul-

(*Continued on Page* 133)

Improved Methods for Adding Insecticides to Fertilizers

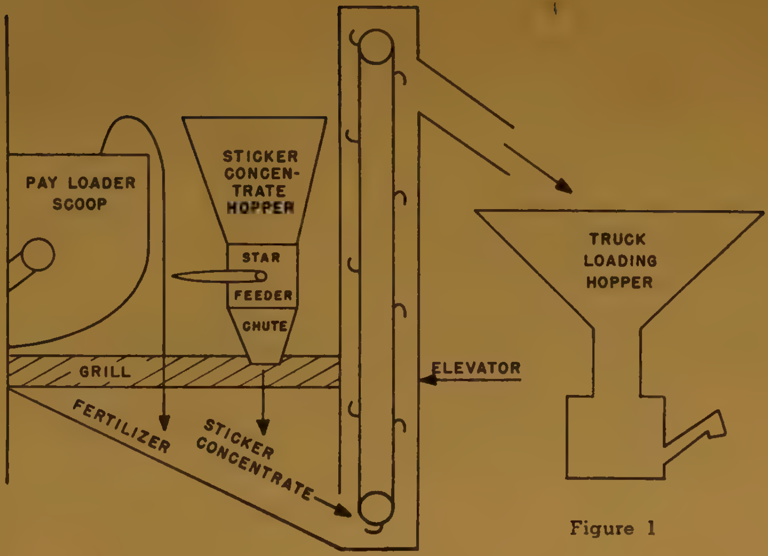

Figure 1

By Victor Smith*

Velsicol Chemical Corp
Chicago, Ill.

INSECTICIDES comprised 95% of the pesticide materials added to fertilizer in 1954, and these insecticides were, except for an insignificant amount, chlorinated insecticides used to control soil insects. Questions arising from the use of other pesticides are *not* major problems of the industry.

Ever since chlordane was used in the first fertilizer-insecticide mixture, there has been much concern about the chemical stability of various chlorinated insecticides added to fertilizer. It has been shown that these insecticides are compatible with the fertilizer components; and that the insecticide formulators are providing stable concentrates for use with fertilizer. Tests are now being conducted to measure residual insecticide activity when fertilizer-insecticide mixtures are simply broadcast on the top of the ground in a fall-of-the-year application. The data developed so far looks favorable not only for the maximum results from fertilizer but also for the excellent control of insects.

It has been stated regarding the practice of adding insecticide to fertilizer, "If the industry had any reasonable assurance that this practice were here to stay, for even several years, we could afford to install proven equipment to do this job on a uniform, economical basis and eliminate most all of the problems that now give us concern."

The increasing consumption of fertilizer-insecticide mixtures, as shown in the accompanying table, indicates that, for several years at least, the industry will be called upon to provide these mixtures. Some very sound reasons can be advanced as to why economical and versatile equipment to apply insecticide to fertilizer should be installed.

The increase in use of fertilizer-insecticide mixtures over the last three years is quite apparent. Calculations show that 1.3% of the commercial fertilizer contained insecticide in 1955; however, the figure is misleading, because it does not indicate that in some areas as much as 10% of the fertilizer was mixed with insecticide. We have reasons to believe the percentage will increase even higher this year.

This increasing demand for fertilizer-insecticide mixtures by the farmer is not just happenstance, but the result of several facts.

1. Almost perfect control of soil insects is provided by soil insecticides applied in fertilizer-insecticide mixtures.

2. The farmer saves time before planting when every hour is crucial.

3. The farmer saves the cost of one entire field application, estimated at about $1.40 per acre, by applying fertilizer and insecticide in one application.

4. The application of fertilizer and insecticide in one operation reduces the number of times a field is worked and allows farmers to take advantage of the winter soil conditioning.

A second reason for installing versatile and economic equipment to add insecticide to fertilizer is that equipment installed to add the present registered insecticides will be pro-

Estimated Use of Fertilizer-Insecticide Mixtures
(In Short Tons)

Year	Total Mixed Fertilizer	Fertilizer Insecticide Mixtures	Increase in Tons	Percent	Percent Total
1952-3	15,722,000	82,500	......	......	.5
1953-4	15,541,000	141,500	59,000	71	.9
1954-5	15,151,000	200,000*	58,000	41	1.3

*U.S.D.A. estimates based on incomplete returns.

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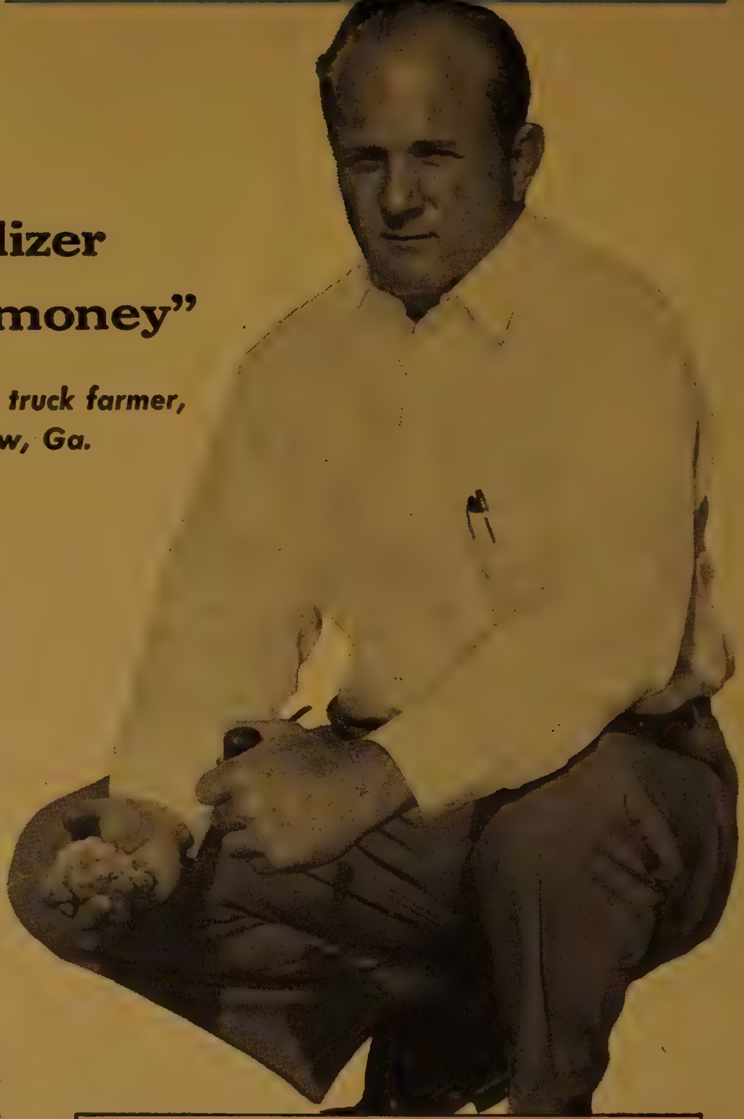
*Presented at the Middle West Soil Improvement Committee, Chicago.

HOW UNION BAG BUILDS MORE BUSINESS FOR THE FERTILIZER INDUSTRY



"Now I know... cutting down on fertilizer actually costs me money"

John Patrick, truck farmer, Marlow, Ga.

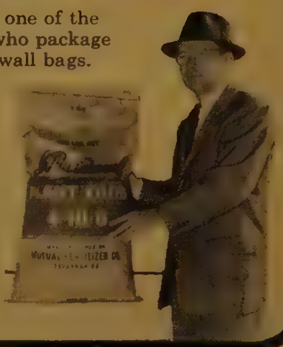
"I've known about fertilizer for a long time," says John Patrick, who with his brother Carl runs a 100-acre truck farm near Marlow, Ga., "but I didn't realize that every *dollar* invested in fertilizer can bring a farmer a *four dollar* return in crop value! That's how the U. S. Department of Agriculture figures it. Like a lot of farmers, I'd tried to *save* money by cutting down on fertilizer, but actually I was *losing* money, as I got lower yields on my crops. Now I know fertilizer is my best investment."

Union's information program increases fertilizer use

Mr. Patrick discovered his "profit formula" in one of the farm magazines he reads. The article was one of many prepared by Union as part of a countrywide newspaper-radio-television educational campaign to help farmers use more scientific methods.

One of the main purposes of this program is to show your customers how to make the best use of fertilizer. As one of the major manufacturers of Multiwall paper sacks for fertilizer, Union Bag is happy to make this contribution to the industry.

Mutual Fertilizer Company is one of the many leading manufacturers who package their products in Union Multiwall bags.



Mr. Charles Ellis Jr., President, Mutual Fertilizer Company, Savannah, Ga.

"I believe Union Bag's information program on the scientific use of fertilizer will help the farmers. Union does as well with its Multiwalls as it does with its fertilizer program. We use Union Multiwalls. They're among the best."

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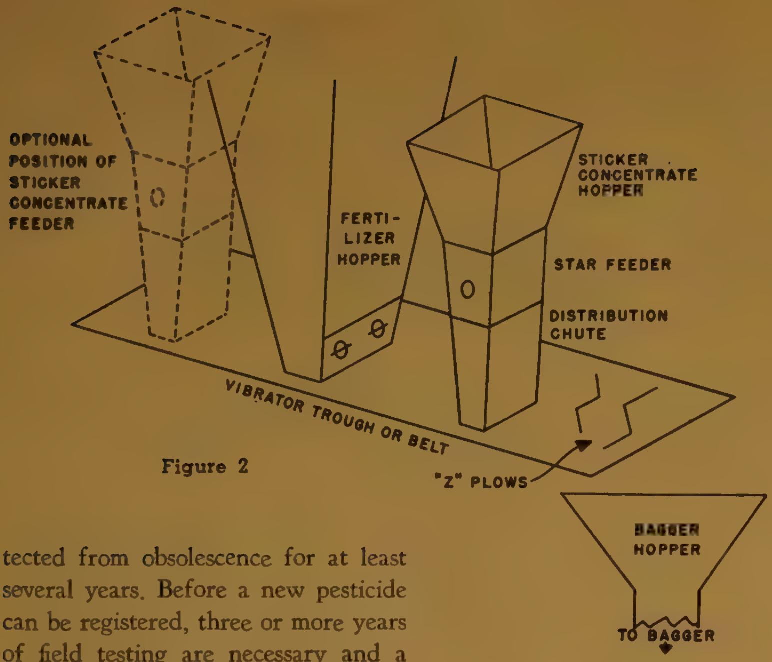

Figure 2

tected from obsolescence for at least several years. Before a new pesticide can be registered, three or more years of field testing are necessary and a million dollars is considered a conservative cost to develop the pesticide for field use. It is probable that equipment for present insecticides can be readily adapted to any new pesticide entering the market. Instead of fearing the advent of new and more numerous pesticides to add to fertilizer, it may be a definite advantage to purchase adequate and versatile equipment, *now*, to capitalize on any newly approved fertilizer-pesticide formulation.

A third reason for installing versatile and economic equipment to add insecticide to fertilizer involves the design and purchase of equipment that will *not in any way* slow the rate of fertilizer production. When more than one percentage of insecticide application is being made to fertilizer, or when more than one insecticide is applied, equipment should be installed that can change rates or materials without stopping production. "Downtime" for any reason during the production season is one of the most expensive factors in fertilizer production costs.

A fourth reason not only to justify investment in versatile and economic equipment but also to justify the practice of adding insecticide to fertilizer itself is the profit derived. Many fertilizer companies have found that their profits from fertilizer-insecticide combinations are approximately twice the profit from straight fertilizers.

A fifth reason for installing new and versatile equipment is the need for assurance that the correct amount of insecticide is being added to fertilizer and that the mixing of the insecticide with the fertilizer is complete enough to provide effective insect control and to meet government regulations.

Some critical consideration must be given to the kind of a content tolerance to be established for the insecticide in fertilizer-insecticide mixtures. Field results from insecticide-fertilizer mixtures made and used in the past indicate that the combined chemicals have performed their individual tasks satisfactorily. The only uncertainty is the degree of homogeneity that should be obtained in producing these mixtures.

We must realize that limits established for straight insecticide formulations need not necessarily apply to fertilizer-insecticide mixtures. Control agencies cannot consider regulations for fertilizer-insecticide combinations to the same fine degree as for straight insecticide formulations. Any effort expended in mixing of fertilizer and insecticide for better distribution beyond that degree that provides the best field control is an economic loss and must be avoided. It will be necessary for the regulatory agencies to use field control data provided by the insecticides in fertilizer-insecticide mixtures as a guide to set specifications on the degree of homogeneity of these mixtures.

The addition of insecticide to commercial fertilizers has been carried out by adding dust concentrates, granular insecticides and oil concentrates. Insecticides are also being added to liquid fertilizers and to liquid nitrogen solutions.

The Velsicol Chemical Corporation and others working with technical heptachlor have developed several new methods and improvements for adding insecticide to fertilizer. The development of a New Heptachlor Impregnation Method to Prepare High Concentrates has made it possible to make 40 and 50 per cent dust and granular concentrates.

Dry Concentrate

A fertilizer sticker concentrate, containing 40% actual heptachlor impregnated on commonly used fertilizer conditioning agents is now being made by this new impregnation method. The application of the sticker concentrate to fertilizer can be adapted to any location in the plant where insecticide is now applied. The sticker concentrate is a dry, free flowing, very uniformly impregnated material. Sticker concentrate is a material which is saturated to the point where it becomes a cohesive, nondustable material and has the following advantages over other formulations designed to incorporate insecticide into fertilizer:

Tests have shown that the distribution of insecticide in fertilizer is very dependable and reproducible when a star feeder is used to add sticker concentrate to fertilizer.

Insecticide vapors or solvent fire hazard cannot possibly be present with the use of the sticker concentrate. Personnel problems caused by the use of liquids are eliminated.

Anticaking properties, provided for the fertilizer by the sticker concentrate, will prevent the fertilizer from caking in the bag or in bulk storage.

(*Turn to Page* 127)

A Special Ag. Chemicals Survey

COUNTY AGENTS

What part do they play in recommending pesticides and fertilizers?

WHAT role does the county agent play in the recommendation and sale of agricultural chemicals in the United States?

By his own assertion, he is an important influence on the buying habits of the farmers in this country and he depends, to a great extent, on the literature and personal visits of agricultural chemical companies for background information necessary for making these recommendations.

That is the result of a spot check of county agents in all parts of the country made last month by *Agricultural Chemicals*. One hundred agents were queried on their activities and opinions. Seventy one replied, yielding the information tabulated in the adjoining box. In addition to the six questions shown, a seventh was asked, requesting opinions on how agricultural chemicals companies could improve their services to the agents.

There is no doubt, at least in the minds of the county agents who replied to our survey, that these advisers have a fairly strong, or strong influence on the purse strings of the man on the farm. That is clearly shown in question No. 1. Apparently, as reflected in the unanimous affirmative vote on question No. 5, county agents have built up their prestige with farmers to the point that their opinions and recommendations are treated with great respect.

Such confidence has not always been shown, of course, and in fact it probably does not represent the view of all farmers even today. But there is no refuting the fact that with increasing economic pressures on the farmer, he is turning more often and with increasing dependence to the county agent to help him make best use of his land.

Answers to question No. 2 show the importance which county agents attach to the literature published by agricultural chemicals companies. In addition to the three sources named, a number of agents mentioned extension specialists and dealers as additional sources of information.

General vs. Trade Name

MOST county agents, when discussing chemicals with farmers, use the general name of the product, or the name of the active ingredient, as opposed to the trade name, as shown by No. 3. However, half of the agents who answered our questionnaire added that they use the trade name "occasionally," or if there is just one company making the product.

The frequency with which soil tests are taken to determine fertilizer requirements is shown in Question No. 4. Rather than make offhand judgments on the land, the agents are using scientific testing methods to be sure farmers are using enough, but not too much, of the right kind of plant food.

To judge by the results on question No. 6, the industry is doing a thorough job of telling the people who count about its products. Every man who answered receives pamphlets, and nearly that many are regularly visited by technical representatives of the companies selling products in his area.

But how can formulators and mixers of fertilizers and pesticides *improve* their services to the county agents? Readers will probably find the answers to this question most helpful.

Fourteen agents urged companies to keep the printed material coming and to continue calling personally on them. A Kentucky agent would like to have "a booklet describing each agricultural chemical produced by the company and its specific uses, application rates for each use, etc."

Another, from Michigan, stresses the importance of keeping literature and recommendations up to date and "keep in line with the Miller Bill."

"We think it would help," said a North Carolina agent, "if a sample of each chemical were made available at each county agent's office to show farmers. They could see the trade names for each chemical." Helpful as that might be, it is likely that most companies would find such an undertaking prohibitive.

From Minnesota comes the request that the companies "perhaps put on educational field trials in local areas with the county agent. Not on a brand name basis but on the general name basis. I would like to do more demonstrations but lack finances to put them on as often as I would like."

An agent in Mississippi wants "more demonstration material," and another, in Missouri calls for "closer contact with college specialists. We seldom set up result demonstrations without their encouragement." Still another, in Alabama, objects to the use of trade names exclusively on pamphlets. "Somewhere on the pamphlet, the general name should be shown."

COUNTY AGENT QUESTIONNAIRE

Here is the questionnaire sent to 100 county agents in all parts of the country and the tabulation of the 71 replies received by this magazine.

We are preparing an article for our readers on the part the County Agent plays in recommending agricultural chemicals. We would like your advice and comments. Would you be kind enough to take a few minutes to answer the following questions on this sheet.

1. Would you say your influence on the buying habits of farmers is:
   - **a. strong 23%**
   - **b. fairly strong 77%**
   - **c. weak 0**
   - **d. insignificant 0**

2. How do you keep informed on agricultural chemicals?
   - **a. company literature 88%**
   - **b. experiment station reports 86%**
   - **c. magazines 53%**
   - **d. other (specify) Eleven mentioned extension specialists**

3. Do you recommend agricultural chemicals by:
   - **a. their general names 100%**
   - **b. specific trade names 48%**

4. To what extent do you use soil tests for fertilizer recommendations?
   - **a. almost always 76%**
   - **b. about half the time 13%**
   - **c. seldom 12%**

5. In general, do you find farmers today more receptive to your advice and recommendations than they were in former years?
   - **Yes 93%**
   - **No 0**

6. Do you get help and information from agricultural chemical companies?
   - **a. pamphlets 100%**
   - **b. personal calls 87%**

7. How could agricultural chemical manufacturers improve their services to you?

(See article for comments on this question)

Interview With One Agent

TO get a first hand report on the activities of a typical county agent, *Agricultural Chemicals* stopped in to see Raymond E. Harman, agent for Essex County, N. J. at his Caldwell office.

Mr. Harman has been on the job for 30 years, since the days when farmers were wont to view the opinions of the advisers with a great deal more skepticism than they now show. He praised the work of fertilizer and pesticide companies in sending out descriptive literature on their products, and for making personal calls at his office.

Most farms in Essex county are within 25 miles of New York City, so land prices are high and farmers have to make every acre count in order to stay in the black. They are willing to try new products and occasionally they let their enthusiasm run away with them.

Mr. Harman told the story of one farmer who read in a farm paper about a product that another farmer had used quite successfully on spinach in another part of the country. "This fellow wanted to try the stuff, but I advised against it, because of the high humidity in these parts," Mr. Harman recounted. "He went ahead and used it, though, and burned his spinach right up. It was the best thing that could have happened to him. It really taught him a lesson."

In his area, timing of fertilizer application is important. Mr. Harman usually recommends banding the plant food to prevent leaching in the sandy soil that is characteristic of the county. To make his recommendations on pesticides, the agent is guided by reports from the State Experiment Station at Rutgers. For herbicides, he finds the report of the Northeast Weed Control Conference in New York especially useful.

Dealing with farmers is only part of the job with Mr. Harman, who has one assistant and soon will get another. His 347 "clients" in the county include about 100 dirt farmers, and the remainder, nurserymen, florists, arborists, golf courses, shade tree commissions, and backyard gardeners.

When the third man is added to his staff, Mr. Harman plans to spend more time on the farms, demonstrating dusting and spraying, and talking about minor elements, and insect and disease control. When he does, he will rely heavily on his big file of company literature to provide him with background information on the complex business of farming.★★

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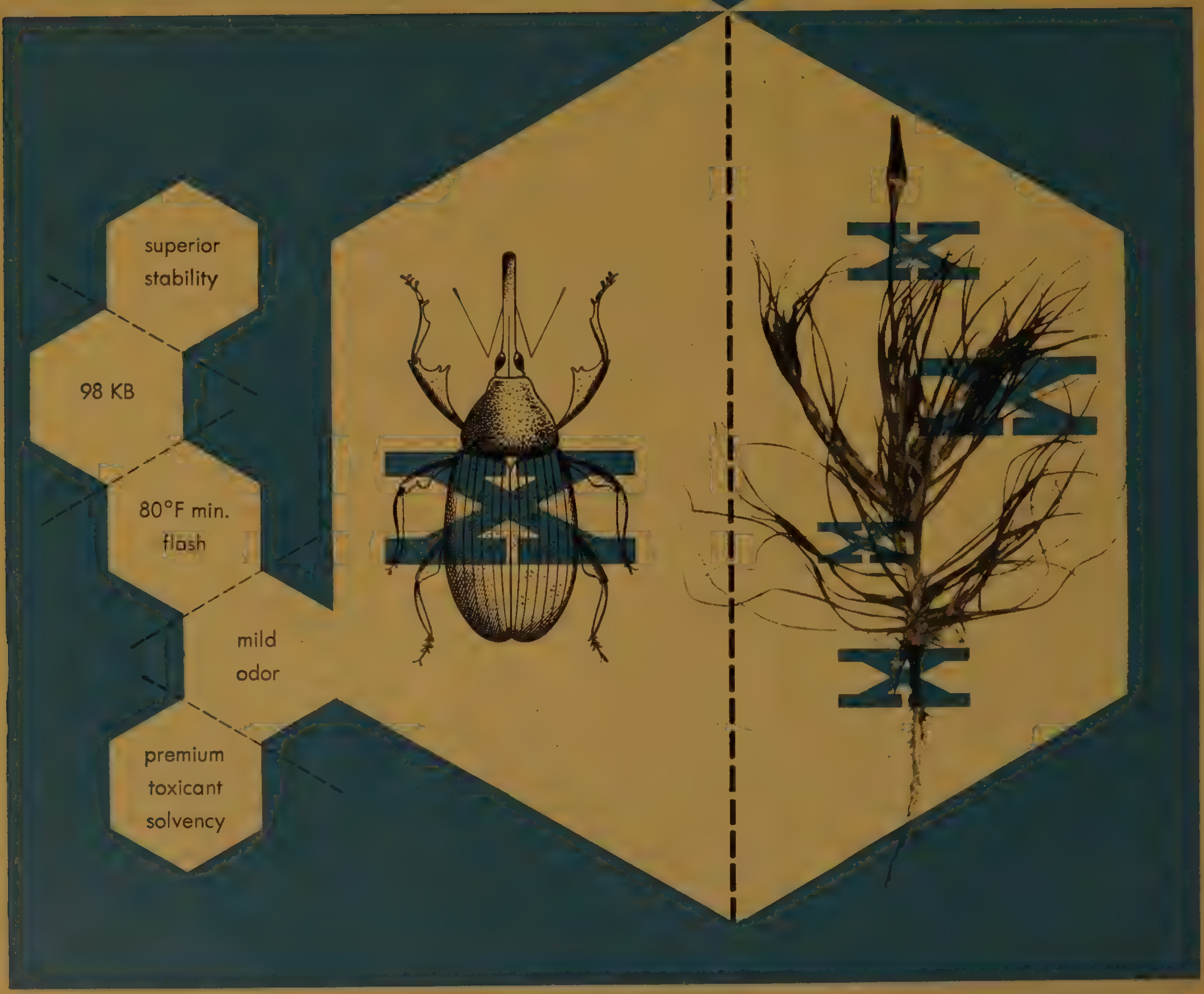

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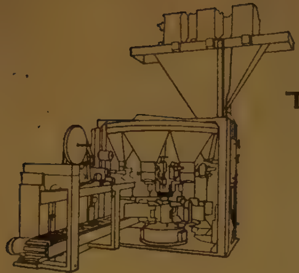

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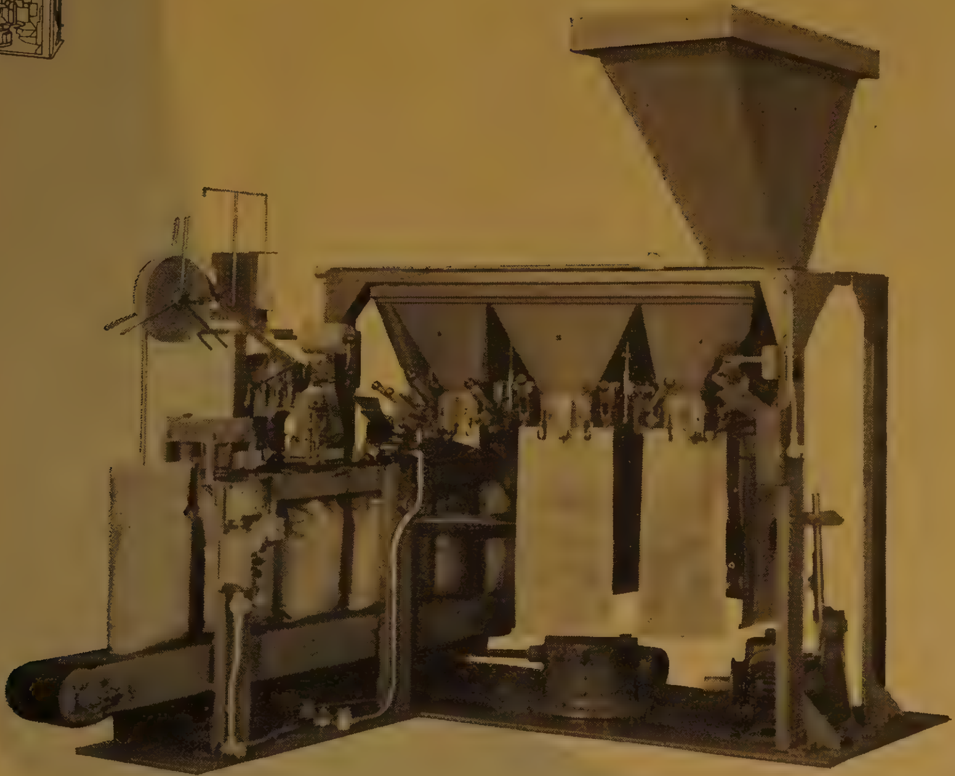

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Fungicide Tests - 1955

conclusion

[*see page* 139 *for information on reprints of full set*]

Cucumbers. On Long Island, Manzate sprays were effective against downy mildew (Table 33). Only fair control was obtained with other fungicides tested.

In Ohio, cucumber anthracnose was controlled best by Manzate or Captan 50-W, but some phytotoxicity is indicated by the fact that plots sprayed with either of these fungicides yielded less than did other plots in the test (Table 34). Highest yields were obtained in plots that had been sprayed with Zerlate (plus either DDT or Dieldrin) or with Tribasic $CuSO_4$.

Cantaloupes. Powdery mildew of cantaloupes was controlled effectively in Florida by 18 applications of Dithane Z-78 or Dithane M-22 or Dithane Z-78 plus Karathane (Table 35). Although excellent disease control was obtained with some copper-containing fungicides, these are not recommended for use in certain soils where they bring about copper-induced iron chlorosis.

In California (11), downy mildew of cantaloupes was more effectively controlled by Karathane (1% dust) or Ovotran (5%) than by Aramite (4%). Dusts were applied twice, with a 2-week interval between applications. In a spray test in Maryland (29a), Tribasic (1-3 lb./100 gal.) plus zineb (2 lb.) gave good downy mildew control when applied 7 times at weekly intervals. Poor control was obtained with Tennam, Tribasic alone (3 lb.), and with mixtures where but 1 lb. of zineb was used along with 1 or 2 lb. of Tribasic. Fair control resulted when zineb (2 lb.) was used alone. B-1956 adjuvant proved to be more effective than skimmed milk.

Onions. Little blast and downy mildew occurred in Orange County, N. Y. (41). Nabam (2 lb.) was mixed with either $ZnSO_4$ (1 lb.) or $MnSO_4$ (1 lb.) and 75 gal. water and the mixtures were sprayed 7 times onto field plots at weekly intervals. No phytotoxicity was observed, and differences in yields among plots were not significant. Nabam plus $ZnSO_4$ is recommended for grower use.

TABLE 33

Yield of cucumbers and incidence of downy mildew and scab in cucumber plots sprayed 9 times (39).

Fungicide	conc./100 gal.	Downy mildew[a]	Scab[b]	Yield[c]
Manzate[d]	2 lb.	18.6	8.1	110.5
Tribasic copper sulfate[d]	4 lb.	42.2	6.1	111.3
Vancide plus $ZnSO_4$	2 qt.; 075 lb.	51.2	5.6	89.0
Captan 50-W	3 lb.	56.3	1.4	107.3
Crag Potato Fungicide 658	2 lb.	56.3	5.7	104.5
Phygon XL	0.5 lb.	57.6	1.5	82.8
Dithane D-14 plus $ZnSO_4$ plus Streptomycin D	2 qt.; 0.75 lb. 100 ppm	63.8	2.9	102.8
Zerlate	2 lb.	63.9	5.8	90.5
Dithane D-14 plus $ZnSO_4$	2 qt.; 0.75 lb.	66.4	3.5	100.5
Tennam	2 qt.	73.9	3.1	98.5
none	—	90.0	2.8	79.5
Streptomycin D	100 ppm	91.4	2.1	84.3

[a] Percentage of destroyed foliage. Difference of 6 significant where $P = 0.01$.
[b] Percentage of fruits infected. No mathematically significant differences.
[c] Average number of fruits harvested from each plot.
[d] Recommended for grower use.

TABLE 34

Diseases and yields of cucumbers in plots in Ohio sprayed with various fungicides and insecticides (J. D. Wilson).

Fungicide	Fungicide conc./100 gal.	no. fruits/treatment Anthracnose	Total	Percentage wilted plants
none	—	163	1998	1.4
He-177; DDT	1.5 lb.	100	1967	0.8
Dithane M-22; DDT	2 lb.	32	1861	2.4
Tribasic copper sulfate; DDT	4 lb.	64	2060	2.9
Captan 50-W; DDT	3 lb.	34	1799	3.3
Zerlate; DDT	2 lb.	117	2099	0.7
Zerlate; dieldrin	2 lb.	191	2099	0.7
Zerlate; Perthane	2 lb.	97	1872	0.4
Zerlate, Karathane; dieldrin	2 lb.; 0.25 lb.	109	2054	1.0
Zerlate, Tribasic; dieldrin	1 lb.; 2 lb.	107	2035	1.0

Cuprous oxide (1.5 lb./100 gal.) or zineb sprays are recommended for use against purple blotch of onions in Colorado (14). Each fungicide, when applied 6 times at 10-day intervals reduced disease incidence by more than half, and sprayed plots yielded somewhat more than one-quarter more than did nonsprayed plots. On Long Island (39) better purple blotch control was obtained with Manzate or Tribasic than with any of the following: Dithane D-14 plus $ZnSO_4$ plus Streptomycin, Crag 658, Dithane D-14 plus $ZnSO_4$, Tennam, Zerlate, Captan 50-W, Streptomycin. Fungicides were applied at least 11 times at weekly intervals. To be most effective, Manzate had to be applied bi-weekly after the first 4 applications.

Potatoes. In 3 locations in Ohio, J. D. Wilson found that several copper-containing fungicides and several organic chemical fungicides gave good control of *early blight* of potatoes. When both the adhesive K-704, a polyacrylate, and the wetting agent Triton X-100 were added to 4-2-100 Bordeaux mixture, there was some increase in yield and more effective control than occurred when Bordeaux mixture was used either alone or with only 1 of the adjuvants. Cop-O-Zink was somewhat more effective than was Tribasic copper sulfate. Plots sprayed with organic compounds yielded more than did those sprayed with inorganic copper compounds. Zineb gave best results, and was followed by the copper salt of dithiocarbamic acid and by maneb. All of these performed somewhat better than Tennam or captan. Satisfactory control was obtained with maneb when used up to 4x recommended concentrations.

In West Virginia (63) early blight of potato was controlled best by zineb, maneb, or nabam plus $ZnSO_4$ (Table 37).

Late blight of potatoes was controlled best in Maine (29) by nabam, Cop-O-Zink, or by Tribasic copper sulfate (Table 38).

In 1 test on Long Island, there was measured the amount of copper deposited on potato foliage sprayed with Bordeax mixture by either the usual high-pressure hydraulic equipment or by 1 of 2 air blast concentrate sprayers (44). Significantly higher amounts of copper were deposited by Myers or Bean machines when compared with amounts deposited by ordinary equipment. Bordeaux mixture was used at either 16-18-100 or 8-4-100 formulations.

Tomatoes. During the past 7 years, many fungicides have been tested for control of *early blight* of tomato seedlings that are grown in Georgia and are shipped to the North as transplants (23). Fungicides have been applied approximately 6 times at weekly intervals during each season. The following fungicides have ranked high in tests for at least 3 years, and are recommended for grower use: Parzate (2lb./100 gal.), Dithane Z-78 (2lb.), and liquid

Parzate (2 qt.) plus $ZnSO_4$ (0.75 lb.). Manzate ranked in the top 3 for 1 year. Dithane D-14 plus $ZnSO_4$ was ranked in 5th place in 1955, but had ranked first or second for 7 years. Tribasic copper sulfate has ranked fourth or fifth over a 7-year period.

In a dusting expeiment in Virginia (59) early blight was most effectively controlled by maneb or copper-manganese or Cop-O-Zink dusts (Table 39).

Watermelon. In Florida (19) good control of Cercospora leafspot was obtained with zineb, maneb, and zineb-captan mixtures (Table 36). Sprays were applied 6 times between March 18 and May 23. Fungicides containing zineb are recommended for grower use.

TABLE 41

Disease control and yield of tomatoes in Illinois (25) sprayed for early blight and anthracnose control.

Fungicide	conc./100 gal.	Percentage defoliation	Anthracnose	Yield
		early blight	percentage	T./A.
Tribasic $CuSO_4$	4 lb.	14.0	17.5	9.5
Phygon XL	1 lb.	13.5	5.4	9.8
Dithane Z-78	2 lb.	10.7	6.9	11.6
Orthocide 50W	4 lb.	14.1	5.3	13.5
Manzate	1.5 lb.	11.4	3.7	10.3
Manzate plus Zerlate	1.5 lb.; 2 lb.	8.5	0.7	14.3
Manzate plus Zerlate	0.75 lb.; 1 lb.	12.5	2.6	11.6
Zerlate	2 lb.	13.2	4.2	12.2
Cop-O-Zink	4 lb.	16.7	27.1	9.7
Tennessee Cu-Mn	4 lb.	14.1	22.2	10.2
Tennam	2 qt.	16.2	4.4	11.9
Filipin	(1000 ppm)	23.1	23.4	7.2
none	—	25.2	23.7	7.7
L.S.D. where $P = 0.05$		4.2	4.2	2.1

TABLE 36

Yield of watermelons in Florida, and incidence of Cercospora leafspot in plots sprayed 6 times (19).

Fungicide	conc./100 gal.	Disease rating[a]	Yield[b]
zineb, captan	1 lb.,1 lb.	1.2	496
maneb	1.5 lb.	1.8	534
zineb[c]	2 lb.	2.0	484
zineb, captan	1.5 lb.; 0.5 lb.	2.0	504
nabam plus $ZnSO_4$	2 qt.; 0.75 lb.	2.4	528
captan	2 lb.	2.6	495
COCS[d]	3 lb.	2.6	401
Copper A Compound	3 lb.	2.8	483
nabam plus $ZnSO_4$[e]	2 qt.; 0.75 lb.	3.4	521
Tribasic $CuSO_4$[d]	3 lb.	3.4	463
Copper-manganese-zinc	4 lb.	3.6	483
Crag 658	2 lb.	3.8	483
zineb[d]	2 lb.	4.0	490
none	—	4.6	517
LSD where $P = 0.05$		0.9	NSD

[a] Where 0 is no disease.
[b] No. melons/A.
[c] Recommended for grower use.
[d] Slightly phytotoxic.
[e] Sprayed 8 times.

TABLE 37

Percentage defoliation and yield of potatoes in plots sprayed 8 times for early blight control in West Virginia (63).

Fungicide	conc./100 gal.	Percentage defoliation[a]	Yield bu./A.
zineb	2 lb.	4.0	673
nabam plus $ZnSO_4$	2 qt.; 0.75 lb.	4.2	620
maneb	2 lb.	4.3	612
Fungicide "X" plus $ZnSO_4$	2 qt.; 0.75 lb.	4.9	600
C. & C. 7764	1.5 lb.	6.6	593
C. & C. 8739	1.5 lb.	6.6	592
Tribasic Copper Sulfate	4 lb.	8.6	541
C. & C. 7443	1.5 lb.	12.5	540
Bordeaux mixture	8-4	8.9	514
none	—	42.1	525
L.S.D. Where $P = 0.01$		7.0	84.0
Where $P = 0.05$		5.2	62.9

[a] 100 days after planting.

TABLE 38

Yield of potatoes in plots in Maine (29) sprayed 8 times for control of late blight.

Fungicide	conc./100 gal.	Yield bu./A.	Rating
Phygon XL	1 lb.	671	6
Cop-O-Zink	4 lb.	632	2
Dithane until Aug. 15,	2 qt.	630	4
then Tribasic $CuSO_4$	4 lb.		
Tribasic $CuSO_4$	4 lb.	591	3
Bordeaux mixture	8-4	580	5
Tennam	4 lb.	560	7
nabam (Dithane D-14)	2 qt.	599	1
none	—	501	8

TABLE 39

Yield of tomatoes dusted either 4 or 8 times for control of early blight in Virginia (59).

Fungicide	Percentage active ingredient	Tons/Acre 4 appl.	Tons/Acre 8 appl.
Tribasic copper sulfate	7.5	14.93	14.05
maneb	4.9	15.43	17.19[a]
copper-manganese	7-2	16.36	16.26
Cop-O-Zink	7-2	15.21	15.01
captan	7.5	14.93	15.15
Tribasic copper sulfate	7	14.88	14.05[a,b]
none	—	11.80	12.07

[a] Currently recommended for grower use.
[b] Phytotoxic.

TABLE 42

Numbers of anthracnose-infected tomato fruit from and yields of irrigated and non-irrigated plots sprayed for anthracnose control in Delaware (15).

Fungicide	Irrigation treatment	Fungicide conc./100 gal.	Diseased fruit	Yield
				lb.
maneb[a]	irrigated	1.43 lb.	124	349
	not irrigated	1.43 lb.	43	219
zineb[a]	irrigated	1.53 lb.	67	268
	not irrigated	1.53 lb.	4	200
none	irrigated	-	124	198
	not irrigated	—	43	175

[a] Recommended for grower use.

TABLE 43

Ratings of early blight and late blight in and yields from tomato plots sprayed 7 times at 8- to 15-day intervals in Quebec (69).

Fungicide	conc./100 gal.	Disease control ratings Early blight	Disease control ratings Late blight	Yield
				lb.
C.O.C.S.	4 lb.	3.88	1.87	463
Captan 50W[a]	2 lb.	1.51	0.70	466
Dithane D-14	2 qt.	1.64	2.47	439
none	—	8.00	7.80	468

[a] Recommended for grower use.

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J. D. Wilson reports that, in Ohio, best control of early blight of staked tomatoes was obtained with tank-mixed copper ethlene bisdithiocarbamate. Zineb gave almost as good control, but plots sprayed with zineb yielded less than did those receiving the copper ethylene bisdithiocarbamate.

In New York (45), maneb (4 lb./A.) and B-622 (6 lb./A) gave best control of both *early blight* and *anthracnose* of tomato. Sprays were applied 5 times between July 8 and August 30. Results of 1 test are summarized in table 40. The same 2 diseases were controlled effectively in Illinois (25) by 6 applications of Manzate or Zerlate or by the 2 fungicides in combination (Table 41). In a test in Delaware (15), maneb-sprayed plots yielded better than did zineb-sprayed ones, regardless of whether or not plots were irrigated (Table 42).

In Florida (17), zineb or maneb is recommended for control of tomato *late blight*. Some 13 applications are made at 6 or 7 day intervals. In Quebec, captan is recommended over COCS and nabam for control of *early blight* and *late blight* (69). Results of 1 test are given in Table 43.

TABLE 40

Disease control and yield of tomatoes in New York sprayed for early blight and anthracnose control (45).

Fungicide	Application rate	Percentage defoliation	Anthracnose	Yield
	lb./A.	early blight	percentage	T./A.
Zerlate-bordeaux	4; 16-8	21	1.8	10.8
Captan 50W	6	36	1.8	9.9
Captan 75W	4	37	1.0	10.8
Captan 90W	3.3	36	1.1	10.1
Dithane M-22	4	24	0.8	10.8
Manzate	3	13	1.1	12.8
Manzate	4	12	1.0	10.2
Orthocide 50W	4	46	1.0	11.0
Orthocide 50W	6	37	0.5	11.6
Orthocide 90W	3.3	37	1.4	9.6
B-622	6	15	0.6	10.3
Thioneb 50W	4	39	2.3	11.3
Cyanamid 5223	4	54[a]	5.5	8.3
Mathieson 1563	4	65	1.7	11.1
Tennessee Cu-Mn.	8	35	2.6	9.3
none	—	87	2.2	10.5
L.S.D. where P = 0.05		12	1.4	n.s.
where P = 0.01		15	1.8	

[a] Very little blight; defoliation due to foliage injury.

Use of Antibiotic Sprays and Dusts

BECAUSE there has been recently an increase in the numbers of spraying and dusting tests in which antibiotics have been used, it seemed desirable to present results of 1955 trials in 1 section of this report.

Field Crops

Streptomycin sulfate dusts and sprays gave significantly better control of tobacco wildlife in Maryland (30) than did Tribasic copper sulfate spray (Table 44). In growers' tests in Tennessee, 200 ppm streptomycin sulfate consistently controlled wildfire. In Maryland (30) 200 ppm streptomycin sulfate sprays gave good control of wildfire in tobacco plant beds that were sprayed 4 times at 7-day intervals. Sprays were applied at both 5 and 10 gal./100 sq. yd. Tribasic copper sulfate (3 lb./100 gal.) gave poor control. Fair control was obtained with streptomycin sulfate dusts.

In Florida (21) 3 applications of 1% streptomycin dust gave excellent control of blue mold of cigar-wrapper tobacco seedlings. Zineb was more effective than Agromycins A and C and streptomycin sulfate in controlling blue mold of tobacco in South Carolina (Table 45). Where streptomycin sulfate was used at 100,200, or 400 ppm. after disease had been detected, it failed to bring the disease under control quickly enough to prevent serious necrosis (52).

Fruit and Nuts

In Iowa, Jonathan apples were sprayed 15 times at weekly intervals between April 30 and August 8 (26). Bordeaux mixture (8-8-100) gave better fire blight control than did either Agri-mycin (100 ppm) or Dithane (2 qt./100 gal.), and is recommended for grower use.

Copper A compound (4-100), although slightly phytotoxic, gave better control of bacterial blight of walnut than did Agri-mycin at 25 ppm. Sprays were applied 3 times, at "early prebloom," late pre-bloom, and "early post-bloom" stages.

Vegetables

When applied once 12 to 24 hours before inoculation, each of 3 antibiotics gave excellent control of the bean disease caused by *Phytophthora phaseoli* (33). Agri-mycin, Agristrep, and Phytomycin sprays were used at 100 ppm. and Agristrep dust was used at 1000 ppm. Good control of *P. infestans* disease of lima beans was obtained with each of the 3 antibiotic sprays. The dust formulation of Agristrep was not tested.

A. F. Sherf and M. W. Miller tested single and multiple applications of streptomycin sulfate (200 ppm) and glycerin (0.5%) against broccoli downy mildew in New York. Best control was obtained where the antibiotic had been used 5 times at 7- to 10-day intervals, but 2 applications and 1 application gave good control. Plants were injured more by multiple applications, and the single application was rated as giving the best over-all performance. Streptomycin sulfate is not recommended for grower use.

Agri-mycin, up to 2800 ppm, was applied 1, 2, 3, and 4 times at 7- to 10-day intervals to cabbages in a field that was infested with *Plasmodiophora brassicae* (54). There was no plant injury, but the antibiotic did not bring about any measurable degree of cure of the club root disease.

Streptomycin sulfate was tested for control of bacterial soft rot of cantaloupes in the field (22) and in storage (20). In each of 3 locations in Florida, the antibiotic gave some degree of control when applied 7 times at 2- or 3-day intervals during harvest (Table 46). It was effective in controlling development of soft rot in storage after having been applied in paste form to stem scars of harvested fruit (Table 47).

Bacterial spot of pepper in Florida (20) was reduced significantly where plants were sprayed 13 times with streptomycin at 2- or 3-day intervals throughout harvest (Table 48).

Either Agri-mycin or streptomycin sulfate at 200 ppm is recommended for control of bacterial spot in tomato plant beds in Florida (17). Agristrep, Terramycin, and Phytomycin sprays (200 ppm) also were effective. Streptomycin dust was less effective than antibiotic sprays. In 2 field tests, 7 weekly applications of mixtures containing 200 ppm streptomycin and 20 ppm terramycin effectively reduced the severity of disease (17).

TABLE 46

Control of cantaloupe soft rot by streptomycin sulfate (200 ppm) applied 7 times at 2- or 3-day intervals throughout the harvest period (22).

Antibiotic	Percentage rotten fruit
Location 1	
antibiotic	64.0
check	77.9
Location 2	
antibiotic	47.3
check	70.0
Location 3	
antibiotic	65.9
check	77.6

Seed Treatments

Field Crops

Bunt of winter wheat in Idaho (61) was controlled by seed treatment with any of the following 8 chemicals—Anticarie (1 oz./bu.), Sanocide (1 oz.), No Bunt

TABLE 44

Control of tobacco wildfire in Maryland (30) with antibiotics.

Bacteriacide	Application rate[a]	Percentage stand reduction	Wildfire disease index[b]
streptomycin SO_4 1000 ppm dust	6 lb.	9.2	44.9
streptomycin SO_4 200 ppm dust	3 lb.	7.9	45.8
Tribasic $CuSO_4$ spray	0.3 lb.; 10 gal. H_20	19.9	77.0
streptomycin SO_4 200 ppm spray	10 gal.	11.7	28.9
streptomycin SO_4 200 ppm spray	5 gal.	17.0	30.2
none	—	48.8	92.1
LSD where P = 0.05		21.8	27.7
LSD where P = 0.01		15.4	19.5

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[a] Rate/100 sq. yd. Materials applied 4 times at weekly intervals.
[b] Where 0 is no disease and 100 means that all leaves have been destroyed. Plants inoculated twice.

TABLE 48

Control of bacterial spot of pepper sprayed 13 times at 2- or 3-day intervals during the harvest period (20).

Bacteriacide	conc./100 gal.	Disease rating[a]
(streptomycin SO_4) (nabam) ($CuSO_4$) (glycerine)	200 ppm 2 qt. 1 lb. 1 gal.	1.88
(streptomycin SO_4) (glycerine)	200 ppm 1 gal.	1.83
(nabam) ($CuSO_4$)	2 qt. 1 lb.	2.71
(streptomycin SO_4) (glycerine)	100 ppm 0.5 gal.	208
streptomycin SO_4	200 ppm	209
none	—	2.73
LSD where P = 0.05		0.21
LSD where P = 0.01		0.29

---

[a] Where 0 is no disease and 5 is maximum possible amount of disease.

TABLE 45

Tobacco wildfire control in seedbeds in South Carolina (52).

Bacteriacide[a]	conc.	Number sprays/wk.	Wildfire disease index
zineb (65% w.p.)[b]	1 lb./100 gal.	1	4.0
		2	3.2
	2 lb.	1	0.2
		2	0.0
	3 lb.	1	0.3
		2	0.2
streptomycin SO_4	50 ppm	1	23.5
		2	13.9
	100 ppm	1	17.7
		2	0.2
	200 ppm	1	10.5
		2	0.2
	400 ppm	1	0.4
		2	0.1
Agromycin A	50 ppm	1	20.6
		2	19.4
	100 ppm	1	19.6
		2	4.2
	200 ppm	1	8.5
		2	1.7
none	—	—	31.0
	—	—	16.4
	—	—	14.8

---

[a] Applied either 5 or 10 times during a 5-week period.
[b] Recommended for grower use.

TABLE 47

Control of cantaloupe soft rot in storage by 1000 ppm. streptomycin sulfate paste applied to stem scars of fruit (20).

Treatment	Percentage rotten fruit 8 days after treatment
antibiotic, 40°F. storage	3.33
check, 40°F. storage	15.00
antibiotic, 80-85°F. storage	30.00
check, 80-85°F. storage	95.00

(1 oz.), Ceresan M (0.5 oz.), Panogen 15 (0.75 oz.), MEMA (0.5 oz.), Velsicol 50-CS-46 (0.5 oz.), and Liquid Mercury 244 (0.75 oz.). All except the last 2 fungicides are recommended for grower use. The Velsicol and Liquid Mercury compounds have not been tested a sufficient number of times to justify recommending. There was less than 1 per cent bunt in plots grown from seed that had been treated with any of the 8 fungicides named. Eight per cent bunt occurred in plots grown from Agrox (0.5 oz.)—treated seed, while there was 41 per cent in plots grown from seed treated with Vancide 51 (4 oz.).

Any 1 of 3 seed treatments (slurry method) gave good control of seed decay and seedling blight of field corn in New York (37). Thiram (Arasan SF-X) at 1.04 oz./bu., captan (Orthocide) at 0.85 oz., and dichlone (Phygon) at 0.75 oz. were used, each with Lindane at 0.25 oz./bu. Any of these treatments is recommended for grower use.

Seven fungicides applied to seed corn as dusts gave good seed decay control as judged from percentage germination in "cold tests" (64). Results of 1 such test appear in Table 49.

In Idaho, seed of brome grass, fescue, alfalfa, red clover, and Ladino clover were treated with Spergon, Arasan, or New Improved Ceresan each at either 8 oz./bu. or 8 oz./100 lb. of seed (24). These treatments are not recommended for grower use because they cannot be expected to improve stands. New Improved Ceresan was phytotoxic to brome grass and fescue when used at 8 oz./bu. There is a benefit from seed treatment of fescue grass in Alabama (1), where head smut is a problem. Ceresan M (0.5 oz./100 lb.) is recommended for grower use, and Agrox (1.5 oz./100 lb.) will be recommended in the future. The following fungicides at 8 oz./100 lb. were not as effective as either Ceresan M or Agrox: duPont I. & D., Orthocide 75, and Vancide 51.

TABLE 49

Percentage germination of chemically treated corn in "cold tests" in Wisconsin (64).

Seed treatment[a]	Percentage germination
none	0
thiram	95
captan	97
Panoram D-31	96
Delsan	96
Pittsburgh Coke & Chem. B-1843	96
Heptachlor-thiram	93
Emmi 5%	95
Emmi 10%[b]	86

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[a] Used at 1 to 1.5 oz./bu. First 4 recommended for grower use; next 3 require further testing.
[b] Phytotoxic.

Over a period of years, seed treatments of lima beans have been tested by J. D. Wilson in Ohio. In 1955, when there was a heavy seed corn maggot infestation, 2 treatments, each containing an insecticide, were particularly beneficial. When Delsan (Arasan plus Dieldrin) or Orthoguard (captan plus Lindane) was used, there were but few deformed ("stag head") plants. Percentages of emergence were about the same as those in plots grown from nontreated seed that had been treated with Dow 9B, Arasan, Spergon, Orthocide 75, Panogen, thiram, or dichlone.

Captan dust, either blown into the furrow (1.88 lb. actual/A.) or mixed with seed (0.79 lb. actual/A), satisfactorily controlled onion smut in New York (41), and is recommended for grower use.

Soil Treatments

For control of diseases caused by soil-borne fungi and bacteria

In California (9), several fungicides have been applied as sprays in furrows at planting time in an effort to control

TABLE 51

Percentage healthy plants and yield of bulbous iris grown in soil treated with chemicals (60).

Fungicide	lb. active/A.	Percentage health plants	yield
none	—	12.6	2692
Terrachlor bulb dip	—	62.5	3081
Terrachlor[a]	200[b]	95.5	3095
	150[b]	90.5	3061
	100[b]	93.2	2980
	50	82.9	2802
Penn Salt NP-1083[c]	80	8.8	2784
	60	11.3	2385
	40	6.3	2802
	20	2.4	2473

[a] Pentachloronitrobenzene.
[b] Recommended for grower use.
[c] 2,4-dinitrofluorobenzene.

TABLE 53

Control of sclerotinia disease of lettuce by soil drenches with 2 fungicides (20).

Fungicide	lb. active/A.	Disease control rating[a]
PCNB[b]	5	31.29
PCNB	10	29.68
PCNB	15	29.10
captan[c]	20	48.98
none	—	27.78
LSD where P = 0.05		6.12
LSD where P = 0.01		8.58

[a] Percentage of diseased plants at harvest.
[b] Terrachlor, 75% wettable.
[c] Orthocide 406, 50% wettable.

TABLE 52

Yield of shallots grown in plots where fungicides had been applied in water suspension into drills before planting (28).

Fungicide[a]	lb./plot
Agrox	6.03
Ceresan M	4.43
Manzate	4.27
Mergamma[b]	2.10
PCNB[c]	1.80
Semesan	7.77
Setrete	6.25
none	3.75

[a] PCNB applied at rate of 60 lb./A. All others applied at rate of 10 lb./A.
[b] Slightly phytotoxic.
[c] Severely phytotoxic.

seedling diseases of cotton. Mixtures containing 50% captan (1.25 or 2.5 lb./A.) and 75% PCNB (2.5 or 5 lb./A.) are preferred over captan, PCNB, 70% maneb (5 lb.), Liquid Ceresan S (1 pt.), or Liquid nabam (1 gal.) plus $ZnSO_4$ (2.5 lb.). These row treatments are not recommended for grower use.

Near Lockeford, Calif., furrow sprays of maneb, captan, PCNB, and Tersan were tested for seed decay and damping-off of sugar beets (7). Each fungicide was applied at the rate of 1.5 lb. actual/A. Maneb and captan are recommended for limited commercial use. PCNB effectively controlled damping-off, but was phytotoxic. Near Wasco, Calif., when chemically treated seed of sugar beets were planted, best control of seedling diseases occurred where zineb (2 lb./A.) had been sprayed into furrows. Maneb and captan were less effective at this location.

In Alabama, broadcast soil fumigation with nematocides 18 days before planting, gave good control of collar rot of peanuts. Dowfume W-85 at 4.5 gal./A. and Liquid Nemagon at 2 gal./A. will be recommended over D-D (15 gal.), and Nemagon dust (2.5 lb.) for grower use.

Soil treatments with 100 to 200 lb./A. of PCNB are recommended for bulbous iris crown rot caused by *Sclerotium rolfsii* (60). Results of 1 test where Terraclor and 2,4-dinitrofluorobenzene (Penn Salt NP-1083) were used are presented in Table 51.

When applied in the furrow at planting time, PCNB (2.5 lb./A. or 5 lb./A.) gave better control of seed decay and root rot of red kidney beans than did captan or maneb (2.5 lb.) or nabam (1 gal.) plus $ZnSO_4$ (2.5 lb.). There has been no commercial recommendation (9). PCNB (25% emul.), when used at 20 lb./A gave better control of white rot of garlic than did mercuric chloride or mercurous chloride, both used up to 10 lb./A. (10). However clove treatments with mercurous chloride (10 lb./1000 lb. cloves) or 75% PCNB (10 lb.) proved more effective than soil sprays or dusts.

Soil applications of Semesan, Setrete, or Agrox resulted in increased yields of shallots grown in soils infested by the pink-root organism (28). Results of 1 test appear in Table 52.

Vapam, at 100 lb./A., gave better control of potato scab in Maryland than did PCNB up to 100 lb./A. or than did amounts of Vapam below 100 lb./A. (50). Soil was drenched with water solutions.

Soil drenches with PCNB or captan did not control sclerotinia disease of lettuce in Florida (Table 53).

Both Terraclor (2 to 6 lb./100 gal.) and mercuric bichloride (1:1500 and 1:2000) slightly reduced infections by the club root organism (34). Chemicals were dribbled into rows over seed at the rate of 3 gal./50 ft. of row.

For control of nematode. Dowfume W-40 at 8 gal./A. is recommended as a soil fumigant to control *root knot* of *tobacco* in South Carolina (51). Good control was obtained in 1 test with each of the following: Vapam (30 gal./A.), Crag 974 (250 lb.), VC-13 (20 gal.), and OS 1897 (1 and 2 qt.). Crag 974 was slightly phytotoxic; OS 1897 was severely phytotoxic.

Injection of Dowfume W-85 into plant beds 2 weeks before planting is recommended for control of *strawberry root knot* in Louisiana (27). D-D at 40 gal./A. gave excellent control of *onion root knot* in New York. Dowfume #-85 was slightly phytotoxic at 8 lb./A.; N869 (25 gal./A.) gave poor control (A. F. Sherf).

Methyl bromide (1 lb./50 sq. ft.) is used in celery seed beds in Florida (20) for control of nematodes. A mixture of D-D (20 gal./A.) and allyl alcohol (25 gal./A.) and the same mixture plus formalin (100 gal./A.) is recommended for trial use to control nematodes, weeds, and damping-off (20).

(*Continued on Page* 139)

Post-harvest Treatments to Control Plant Diseases in Transit and in Stores

Fruit

Brown rot and *Rhizopus rot* of peaches were reduced by some treatments where fungicides were used in a hydrocooling test (32). Dowicide A proved to be more effective than chlorine (Table 54).

Summary

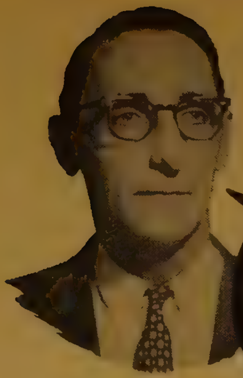
HELMINTHOSPORIUM diseases of both field and sweet corn in Florida were controlled best by nabam plus $ZnSO_4$ or by maneb sprays. Dusting with zineb or maneb gave excellent control of blue mold in tobacco plant beds.

TABLE 54

Percentage reduction in 2 rots of peach fruit following treatments with fungicides during hydrocooling (32).

Fungicide	conc.	Percentage reduction brown rot	Percentage reduction Rhizopus rot
Dowicide A[a]	0.1%	57	17
chlorine[a]	100 ppm	21	17
Dowicide A[b]	0.1%	89	43
chlorine[b]	100 ppm	48	19

[a] Fruit placed immediately in storage at 75°F.
[b] Fruit stored 5 days at 40°F., then kept at 75°F.



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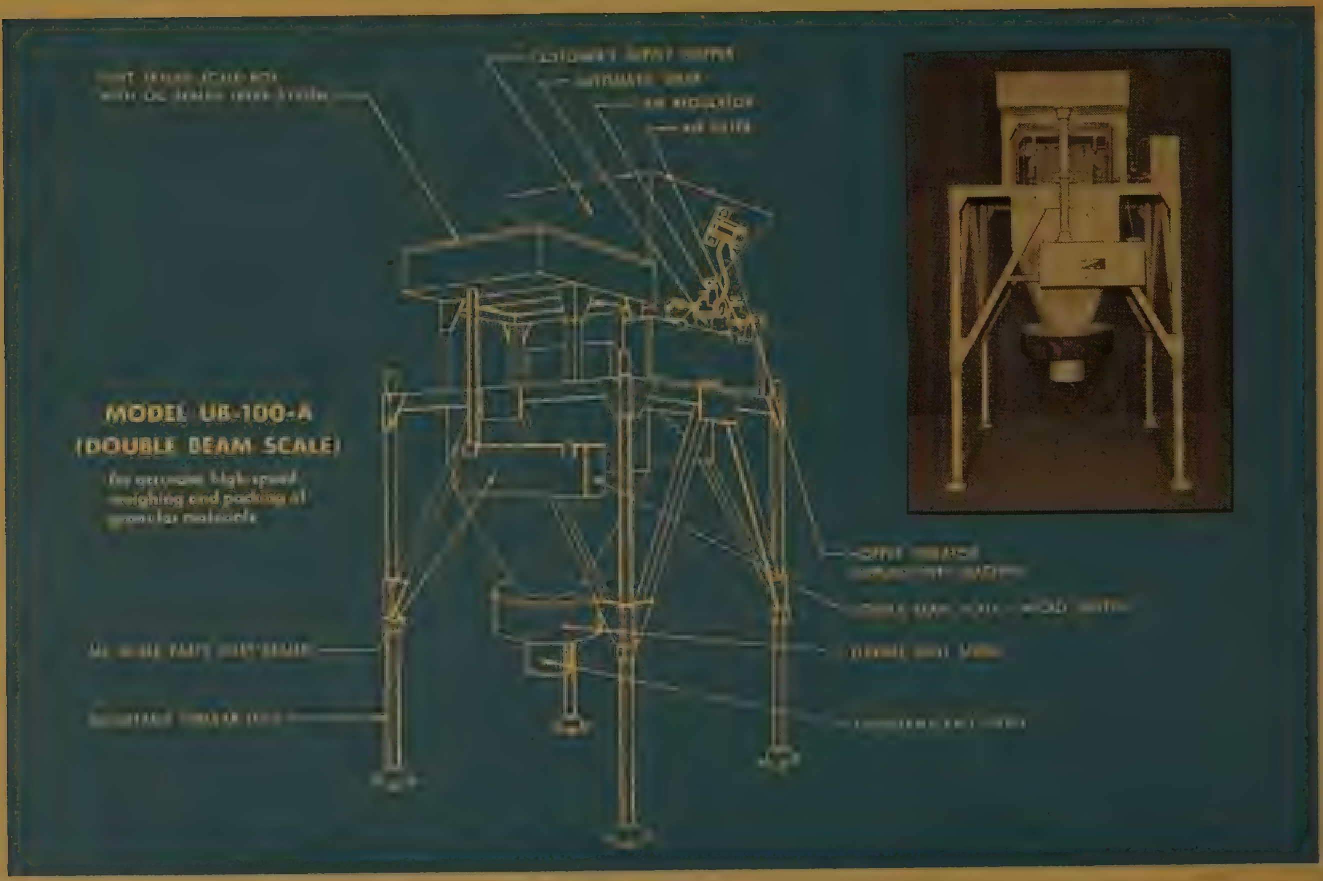

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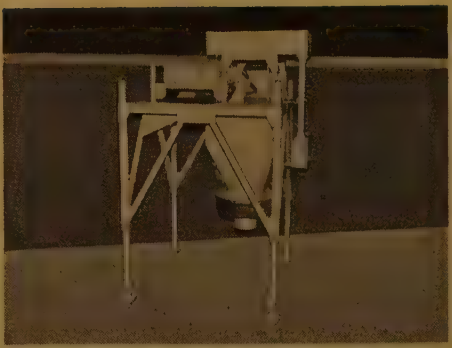

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C. L. Durham
Plant Superintendent
Dixie Guano Co., Laurinburg, N. C.

"The I & C Bagger has enabled us to up production to 50 to 60 tons of fertilizer per hour, compared to 35 to 40 tons in the past," says Dixie Guano plant superintendent C. L. Durham, "and we've been able to do it with one weighing operator instead of three. The I & C is as fast and efficient a bagger as I've ever encountered. Its performance has been little short of sensational."

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Dixie Guano's I & C installation has given the company's Laurinburg, N. C., plant an average production rate of 16 to 17 100-lb. Multiwalls per minute. "That's as fast as a man can get bags under the spout," says Mr. Durham.

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Fertilizer companies who have seen the I & C Bagger in operation have bought more than 200 units in the past two years. Regardless of the size of their plants, manufacturers have found that the I & C Bagger reduces packaging labor costs, increases production, and can bring about important economies in the cost of the Multiwall bags themselves.

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FERTILIZER
Views and News

By Vincent Sauchelli

Chemical Fertilizers and Nutrition

CAN chemical fertilizers increase the nutritional value of a crop? This question pops up periodically. Some investigators stoutly maintain that they can; others, with equal earnestness, adduce evidence that they cannot. The answer apparently cannot be given in a clean cut decisive "yes" or "no." Since much can be said on both sides, the real answer perhaps is that, up to the present, science does not really know. It may be interesting to review briefly some of the pros and cons.

One thing is certain: chemical fertilizers can be used to produce more food of a high nutritive value at less cost, and therefore at a profit for the farmer. In a discussion of this kind it is always advisable to define the terms. What do we mean by "nutritional values?" Are we interested in the composition of the whole plant or of only the seed or fruit? The nutrient elements vary greatly in different parts of a plant. Man almost always eats for nutrition only a part of the plant. Much of the nutritive value of crops for man's consumption comes indirectly from the flesh, eggs and milk of animals.

Research in our country and abroad shows that it is possible to increase the protein content of forage crops by applications of fertilizer, nitrogen and other mineral elements. Phosphate has increased the vitamin A content of carrots in Arizona. Applying nitrogen to wheat in the spring, reports the North Carolina Experiment Station, increases the protein content to the point where a flour company in that state pays a premium for it. And many other similar favorable reports from experiment stations could be cited.

On the other hand Michigan State College investigated, over a 10-year period, the nutritional value of milk produced by cows feeding on chemically fertilized and unfertilized soils. Apparently only small differences were observed in the milk produced by cows fed on the same forages when grown on the fertilized and unfertilized soils. This was to be expected, if we can judge from parallel experiments elsewhere. Nature strives to maintain the composition of milk and seeds uniform; if conditions exist which are unfavorable, like deficient rations or unbalanced soil fertility, less milk or fewer seeds will be produced, but what is produced will be close to normal composition. The concensus of those who attended the Michigan symposium on nutrition, where the report was presented, seemed to be that this investigation cannot be considered conclusive. The experimental limits of this work at Michigan State were too narrow to be conclusive. A large body of experimental evidence from many reliable sources shows definitely that a heavy fertilization of a depleted soil will improve the nutritional value of crops grown on that soil.

The problem is terrifically complicated, involving the interplay of a bewildering number of genetical and environmental factors. Anyone who has eaten strawberries or vegetables grown in his own garden on a soil adequately treated with a complete fertilizer will undoubtedly settle for mineral fertilization: the extra flavor and "nutritional value" of such home garden produce can be sensed by the palate. Meanwhile, research will have to continue along many lines of investigation before we can get a clear, coherent pattern of evidence to support or deny the effects of fertilizer on the nutritive value of our foodstuffs.

Response to Fertilizers

YOU have heard about the person who not knowing it couldn't be done, went ahead and did it? Often I am reminded of this when considering a farmer's use of fertilizers. So many complex, interesting factors are involved in the response of crops to fertilizer, that it is both amazing and satisfying to see how farmers, regardless of the 'ifs" and "ands" of the researchers, put on the fertilizers and get a profitable response. Chemistry, biology, physics, botany, physiology, in fact, almost every branch of science is involved in the correct interpretation of the response of crops to the application of chemical nutrients to the cropland.

Of course, fertilizer is only one of the many factors which have to be considered in determining the crop producing power of a soil. Consider, for example, some of the other major factors: drainage conditions, depth of top soil, tilth, pH, microbes, nematodes, soil temperature, percentage of clay and humus—all these and others can influence response favorably or otherwise. One has first to determine which may be limiting factors to the desired end result, and then eliminate or neutralize them insofar as possible. Also to be considered are the following factors which impinge directly on the fertilizer treatment: the functions of the individual chemical nutrients, and how they react one with the other, and with the colloidal complex of the soil; placement of fertilizer, with respect to root pattern of the crop; influence of climate; effect of applying animal manure or turning under a green cover crop; influence of rotation on residual fertility; best time for applying nitrogen; type of phosphatic fertilizer; amount of chlorine of the potash carriers that can be tolerated. There are many other factors which have a direct influence on the applied fertilizer but these are the most important.

Michigan State College is carrying out a series of comprehensive field tests to determine the factors which are chiefly responsible for the optimal response of crops to fertilizers. These tests were organized in 1955 by the joint efforts of the agronomy and economics departments and are being partly supported by the fertilizer industry. Necessarily, it will take at least 5 years for the investigation to produce tangible results. When the results are finally given out they will have dependable value. Because of the many factors involved and the statistical basis of this remarkably well-organized field experiment it is not possible to do more than mention it in this limited space. It is hoped the investigators will at some later date prepare a detailed description of the experiment and the philosophy behind it for the readers of this journal.

"A pound of nitrogen is a pound of nitrogen"

TRUE enough perhaps if you consider the statement narrowly. One pound of nitrogen from urea is as alike to one pound of nitrogen from ammonium nitrate as two peas in a pod, insofar as the element itself goes. But consider the form in which it occurs, and the other chemical elements with which it is associated and how these react one upon the other and with the soil, and the value of that pound of nitrogen takes on a different complexion. If you have an acid soil for example, the value of the nitrogen from an acid-forming carrier like sulfate of ammonia is less than the same nitrogen from nitrate of soda or calcium nitrate or cyanamid. On the other hand, if you are dealing with an alkaline soil, and one deficient in sulfur, then certainly the value of sulfate of ammonia is clearly higher than from the carriers just previously listed.

This leads to the concept of acid-forming and base-forming fertilizers. Sulfate of ammonia is converted quickly by soil microbes to nitric and sulfuric acids. To neutralize the amount of acid residue so formed by 100 pounds of sulfate of ammonia in a soil requires 110 pounds of limestone (calcium carbonate.)

Similarly, other nitrogen carriers produce acid effects: for example, to neutralize the acidity left behind by the application of 100 pounds of anhydrous ammonia requires the use of 148 pounds of limestone; 100 pounds of urea develops an acid residue requiring 84 pounds of limestone; 100 pounds of ammonium nitrate leaves an acid residue requiring 59 pounds of limestone to correct.

So, when one says "nitrogen is nitrogen," he may be right . . . but

Superphosphate on Pastures

SUPERPHOSPHATE dressings on permanent pastures have been very popular especially in our Northeast grassland region. Many successful dairymen used to apply a heavy dressing of single strength super once every few years and supplemented this with liming once every 4 or 5 years. Since dairy farms have a supply of barnyard manure, the phosphate and lime program plus the application of manure built up and maintained a fairly high level of fertility and produced excellent grazing.

The Grassland Research Institute in Great Britain has published an interesting report on its investigation of this practice of phosphating grassland on calcareous soil at different rates and at different seasons. (1) The test pasture chosen was deficient in phosphorus. Plots were treated as follows: 900 lbs. superphosphate per acre in the spring of 1st year only; 300 lbs. super each spring; 300 lbs. in spring of 1st year only; 100 lbs. each spring; 100 lbs. three times a year each year; 33⅓ lbs. three times a year each year. All plots received the same basic application of nitrogen and potash. The investigators measured the crude protein yields each year, and for the 3-year period of the test, the phosphorus uptake by the forage plants. All plot results calculated on a per-acre basis. It may not come as a surprise to many agronomists that the best total crude protein yields and the best botanical composition of the forage plants occurred on the plots receiving the three 100 lb. dressings per acre each year. The plot receiving 3 dressings of 33⅓ lbs. each year also was in the front rank. These results should interest our livestock men.

Apparently, on calcareous soil and under other conditions which might cause the quickly available phosphate to be reverted rapidly to less available forms, it is best to make smaller dressings at more frequent intervals. Of course, the question of cost of frequently applying the phosphate enters the calculations and this extra cost must be weighed against the value of the extra protein. One must not forget also that nitrogen dressings are also a positive factor in the economical production of grassland digestible nutrients. Perhaps the present trend to the use of a complete fertilizer high in nitrogen applied in the spring and in the fall is a logical solution of the problem.

When is a Farm?

HOW often have you heard or read about "the typical farmer" and the "typical farm operation?" This is a fiction. There is no typical farmer or typical farm operation. This is on a par with "the statistical farmer." The U. S. Census tabulation of 16 million agricultural workers is very misleading, according to an analysis published recently by Capper Publications. This report points out that the census tabulation includes many who own land and operate "backyard gardens and anyone with a cash income from such operation as low as $350 a year." Many of these small, so-called farmers can hardly be classified as farmers in the true economic sense, since they contribute little if any food and profit from farming to the national economy.

We have about 5 million farm families in the country, but their out-

(*Continued on Page* 137)

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LISTENING Post

Effects of Certain Herbicides on Incidence of Plant Pathogens

This department, which reviews current plant disease and insect control problems, is a regular monthly feature of AGRICULTURAL CHEMICALS. The comments on current plant disease problems are based on observations submitted by collaborators of the Plant Disease Epidemics and Identification Section, Horticultural Crops Research Branch, U. S. Department of Agriculture, Beltsville, Md.

By Paul R. Miller

W. E. Chappell and L. I. Miller of the Virginia Agricultural Experiment Station report results of weed control studies in peanut fields in Virginia in 1954, which indicated that peanut plants in herbicide-treated areas were often larger and grew more vigorously than those in untreated areas. Laboratory studies in the summer of 1954 showed that certain herbicides were effective against several parasitic fungi and the sting nematode. In peanut fields, disease intensity associated with herbicide treatments was measured. It was not definitely established whether the herbicides actually acted as fungicides and nematocides under field conditions, but the evidence suggests that their usage may influence disease development in peanuts.

In 1953 and 1954 peanut plants in fields sprayed with dinitro-o-sec-butyl-phenol as a pre-emergence treatment for weed control were larger than those in adjacent unsprayed areas. Since all areas were free of weeds, the increased size of the sprayed plants was apparently due to some factor other than weed control, possibly to the effect of the chemical on the incidence of some soil-inhabiting parasitic organism.

In the laboratory studies in the summer of 1954, *Sclerotium rolfsii*, *Phytophthora parasitica* var. *nicotianae*, *Helminthosporium victoriae*, *Fusarium oxysporum* f. *lycopersici*, and *Fusarium oxysporum* f. *conglutinans* were grown on an agar medium to which herbicides had been added at an approximate field rate. The surface area of a Petri dish was used as a basis for calculating the dosage. The herbicides used, their symbols, and the rates of application are listed in Table 1. The herbicides are referred to by their symbols.

TABLE 1.
Herbicides tested on certain fungi and the sting nematode

Herbicide	Symbol	Rate per acre in pounds
Sodium pentaclorophenate	PCP	20
Dinitro-o-sec-butylphenol	DN	9
Isopropyl-N-(3 chlorophenyl) carbamate	CIPC	6
2(2,4,5-trichlorophenoxy) propionic acid	2,4,5-TP	2
2,4-dichlorophenoxy acetic acid	2,4-D	2
3,4-dichlorophenoxy acetic acid	3,4-D	2
Maleic hydrazide	MH 30	10
N-1-naphthyl phthalamic acid	Alanap-3	6
Sodium 2,4-dichlorophenoxyethyl sulphate	SES	3
3-(3,4-dichlorophenyl)-1, 1-dimethylurea	Karmex DL	1
a-chloro-N, N-diallylacetamide	CDAA	5
a-chloro-N, N-diethylacetamide	CDEA	5
a-chloro-allyl diethyldithiocarbamate	CDEC	5
2,2-dichlorophenoxypropionic acid	Dalapon	20
3-amine-1,2,4-triazole	AT	10
Sodium 2,4,5-trichlorophenoxyethyl sulphate	Natrin	3
2-methyl, 4-chlorophenoxyacetic acid	MCP	2
2,4-dichlorophenoxyethyl benzoate	Sessin	2

Difco potato dextrose agar was used as a culture medium for all the fungi, except *P. parasitica* var. *nicotianae*, which was grown on Difco oatmeal agar. Five ml. of solution of the desired concentration of herbicide was added to 100-mm Petri dishes to which was added 20 ml. of agar. A 2-mm plug of young mycelium was transferred to the surface of the resulting medium in triplicate dishes and incubated at 30°C. The diameter in millimeters of the fungus colonies was measured and recorded at the end of 6 days. The results are recorded in Table 2.

DN and PCP were the only chemicals that inhibited all pathogens at the usual field rate of application. CIPC, CDAA, CDEA and CDEC prevented growth of some but not all of the organisms.

Since PCP and DN reduced growth of all organisms included in these studies, these two chemicals were tested at further dilutions, using the same organisms as above. Four replicates were used. The diameters of the colonies in millimeters were recorded after incubation at 30°C. for 6 days (Table 3). When DN and PCP were further diluted certain pathogens failed to grow at 0.63 pounds per acre. In general PCP was more effective than DN at the lower concentrations. In experimental plots on peanuts, these materials have been applied at twice the normal field rate (40 and 18 pounds, respectively) for weed control without adverse effect on the crop, indicating that higher rates may be used safely if there are other advantages than for weed control.

The effect of several herbicides on the sting nematode (*Belonolaimus gracilis*) was also studied in the laboratory. Three adult nematodes were immersed in Syracuse watch glasses containing the chemicals at concentrations of 0, 10, 100, 1000, and 10,000 ppm in water. Survival counts were made after 48 hours immersion at room temperature. The chemicals tested are given in Table 1. CIPC, DN, and PCP killed all nematodes at 100 ppm. PCP reduced the nematodes at a concentration as low as 1 ppm in 48 hours. Other chemicals in the test killed the adult nematodes at high concentrations, but still others had little or no effect at 10,000 ppm (Table 4). These studies indicate that certain herbicides might be effective in reducing the incidence of sting nematodes in the field.

Since the laboratory studies showed that DN and PCP were effective against certain plant parasitic fungi and the sting nematode, field studies were initiated in 1955 to test

(*Continued on Page* 135)

TABLE 2.

Average diameter in mm. of fungus colonies 6 days after inoculation on media containing herbicides

Herbicide	S. rolfsii	P. parasitica var. nicotianae	H. victoriae	F. oxysporum f. lycopersici	oxysporum f. conglutinans
PCP	2	2	2	2	2
DN	2	2	2	2	2
CIPC	2	21	2	39	16
2,4,5-TP	67	44	16	82	53
2,4-D	77	73	18	56	53
3,4-D	47	74	15	92	54
MH 30	48	66	90	90	53
Alanap 3	40	64	24	78	43
SES	79	71	47	90	57
Karmex DL	15	64	21	76	38
CDAA	40	12	2	2	2
CDEA	41	57	2	81	42
CDEC	2	64	2	59	29
Ck	88	70	66	92	57

TABLE 3.

Average diameter in mm. of fungus colonies 6 days after inoculation

Herbicide	Rates per acre in pounds	S. rolfsii	P. parasitica var: nicotianae	H: victoriae	F. oxysporum f. lycopersici	F. oxysporum f. conglutinans
PCP	10.00	2	2	2	2	2
"	5.00	6	2	2	2	2
"	2.50	9	2	2	4	2
"	1.25	3	2	2	20	2
"	0.63	9	2	2	21	7
"	0.32	4	13	10	37	20
DN	4.50	2	2	2	2	2
"	2.25	7	2	2	30	16
"	1.13	4	15	10	20	24
"	0.57	7	27	14	37	29
"	0.28	6	32	19	47	30
"	0.14	50	36	19	62	35
Ck.	No chemical	91	75	33	90	55

Table 4. Average survival of 3 sting nematodes after immersion 48 hrs. in various concentrations of herbicides

	Concentrations in ppm					
Herbicides	0	1	10	100	1000	10,000
DN	2.0	......[a]	3.0	0.0	0.0	0.0
CIPC	2.5	......	2.5	0.0	0.0	0.0
MCP	3.0	......	......	2.0	1.0	0.0
2,4-D	3.0	......	......	1.5	0.5	0.0
2,4,5-TP	1.5	......	......	1.5	0.5	0.0
Karmex DL	2.0	......	......	0.5	0.0	......
3,4-D	2.0	......	......	1.0	0.0	0.0
PCP	2.5	1.5	0.5	0.0	0.0	0.0
Dalapon	1.5	......	......	1.5	3.0	2.0
SES	2.0	......	......	2.0	3.0	2.0
AT	2.5	3.0	3.0	3.0	......	......
Natrin	3.0	3.0	3.0	2.5	......	......
Sessin	3.0	3.0	3.0	3.0	......	......
Alanap 3	3.0	2.5	3.0	0.0	......	......

[a]—not tested.

TABLE 5.

Number of dead peanut plants per 300 feet of row showing evidence of infection by Sclerotium rolfsii

	Farms				
Treatment	A	B	C	D	Average
Check	9.3[a]	0.5	0.5	2.8	3.2
DN, 9 lbs./A.	4.5	0.0	0.3	0.5	1.3

[a]—Each value is an average of four readings.

TABLE 6.

The effect of DN and PCP on peanut plant vigor and Cercospora leafspot

Treatment	Growth rating[a]	Average number of spots per central stem leaflet
DN, 12 lbs./A	5.0 A[b]	0.49 A
PCP, 30 lbs./A	5.0 A	0.56 A
Cultivated check	3.9 B	0.82 B

[a]—For footnotes see Table 7.

Mediterranean Fruit Fly Again Found in Florida

This column, reviewing current insect control programs, is a regular feature of AGRICULTURAL CHEMICALS. Mr. Dorward is head—Economic Insect Survey Section, Plant Pest Control Branch, U. S. Department of Agriculture. His observations are based on latest reports from collaborators in the U.S.D.A.'s pest surveys throughout the U. S.

By Kelvin Dorward

THE Mediterranean fruit fly (*Ceratitis capitata*), the most important pest of citrus of the fruit fly group, has again been found in Florida. The current infestation was first found April 13 of this year in grapefruit from a backyard in northwest Miami in the vicinity of docks and an airport. The insect is now known to extend from Pompano Beach about 15 miles north of Fort Lauderdale to Kendall which is about 10 miles south of Miami. At present there are no known infestations in commercial orchards. Action has been taken by both the state and federal governments to delimit the infestation and initiate eradicative measures. A Federal quarantine has been established with the effective date May 16.

The first occurrence of the Mediterranean fruit fly in Florida was in 1929 when it was discovered in a grove near Orlando. Subsequently, it became scattered over an area of about 10 million acres. After a vigorous and successful campaign of 18 months involving an expenditure of over $7,000,000 of state and federal funds, the insect was eradicated and no specimens had been found in Florida until the Miami find in April of this year.

The pest was not known to occur in Central America until March, 1955, when it was found in Costa Rica. By May of last year it was found established on the central plateau of Costa Rica in an area of 30 by 70 kilometers. An infestation was also found over the mountains to the south. Infestations were heavy in peaches but moderate in oranges and other citrus.

The Mediterranean fruit fly is known to attack over 200 cultivated and wild hosts. Some of the more important hosts include orange, grapefruit, lemon, peach, pear, apricot, apple, coffee, fig, avocado, grape and date. The pest also attacks such vegetables as pepper and tomato.

Under average Hawaiian conditions a generation of the fly is completed in about one month. After emergence from the pupae there is a preoviposition period of about 20 days. Eggs are usually laid in mature-green or ripe fruit of host varieties. One female lays 1-10 eggs at a time in punctures it makes in the host fruit, and several females may later use the same puncture resulting in perhaps a hundred larvae in the same fruit. Eggs hatch in 2-3 days, the larvae feed for 10-12 days, and the pupation period in soil about 10-11 days. Cooler temperatures extend the life cycle over a period of several months.

Prior to the recent find in this country the Mediterranean fruit fly was known to occur in over 40 countries, territories or geographical areas.

Other Insect Activity

THE spotted alfalfa aphid continues to be a serious pest in several states. By late April thirty-five percent of the alfalfa fields in the main alfalfa growing area of Oklahoma had been plowed up. Southwest Missouri reported heavy damage as did southeastern Kansas. The insect was spreading northwest in Kansas and was expected to become a serious threat to alfalfa of the State. Serious damage was also reported from north and central Texas, and areas of Arkansas, New Mexico, Arizona and Utah. In early April of this year the spotted alfalfa aphid was reported for the first time east of the Mississippi River when specimens were collected on alfalfa at Gainesville, Florida.

The pea aphid has also been a serious pest of alfalfa during April and early May. In Missouri, Arkansas and Kansas the insect has been a serious pest on alfalfa both by itself and in a complex with the spotted alfalfa aphid. Other states reporting heavy populations of the pea aphid include Arizona, Louisiana, Illinois, Utah, Texas and Delaware. Alfalfa weevil larval activity ranged from light to heavy in infected areas of Virginia, Maryland, Delaware and Pennsylvania.

Small grain insects, which caused concern during late April and early May, included the greenbug and the brown wheat mite. During late April heavy populations of the greenbug were reported from localized areas of Utah, New Mexico, Texas, Oklahoma, Kansas and Missouri. The brown wheat mite has been reported in damaging numbers from Utah, Colorado and Kansas. Damage was reported earlier from Texas and Oklahoma but populations are now on the decrease.

The winter mortality of the European corn borer has been figured at 23 percent in southern two-thirds of Minnesota and populations that have survived the winter are sufficient to cause damaging infestations in several areas of the state. Borer pupation had reached 40 percent at Bridgeville, Delaware, April 23.

Among the tobacco insects attracting most attention were budworms, green peach aphid and grasshoppers in Georgia and flea beetles in North Carolina.

Cotton aphids were of wide concern in Texas, with serious damage in the Lower Rio Grande Valley. Boll weevil and bollworms were also damaging cotton in the latter area, while seed-corn maggot caused severe loss on germinating cotton in Alabama.★★

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CABBAGE **CAULIFLOWER** **BROCCOLI** **BRUSSELS SPROUTS**	Club Root Black Root
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WASHINGTON
Report

by
Donald G. Lerch
Cornwell, Inc., Washington, D. C.
(Agricultural Chemicals Washington Correspondent)

FOR the first time in over twenty-five years, the Mediterranean fruit fly has reappeared in the United States. The resources of the Federal, State and County governments along with industry are being mobilized to achieve complete eradication of this dangerous insect pest as quickly as possible. This marks the first infestation since the 1928, 1929, and 1930 outbreak which was centered around Orlando, Florida, in the citrus belt. The current infestation seems concentrated in two counties, Dade and Broward, covering Miami and adjacent areas.

"In all my years in this field, rarely have I witnessed such a willingness to cooperate among all those concerned with an insect control problem," Dr. W. L. Popham, director of Crops Regulatory Programs, U. S. Department of Agriculture, commented to *Agricultural Chemicals*. "During the Washington hearing held by the U. S. Department of Agriculture on Mediterranean fruit fly we were heartened at the sincere expressions of concern over the seriousness of the outbreak and wholehearted offers to cooperate fully. Only with the complete cooperation of all concerned can the control and eradication program be successful.

"The U. S. Department of Agriculture is considering its role as that of full partners," Popham continued. "When you realize that this outbreak of the Mediterranean fruit fly affects the agricultural interest in a third or more of the state, you recognize that we have a tremendous task in front of us. We have full confidence in the Florida State and County authorities in carrying out their share of this eradication program."

Attending the hearing were representatives of the Florida State Plant Board, the National Plant Board, the Florida Citrus Mutual, the Florida Citrus Commission, the Florida Fruit and Vegetable Association, and members of Florida's Congressional delegation.

Parallel action by the State of Florida makes it possible for Federal quarantine officials to enter the State and set up inspection and eradication procedures right in the areas of infestation. Because the pest contaminates both fruits and vegetables as well as the soil, the quarantine regulates the movement of fruits and vegetables and all objects contaminated with soil. While the quarantine is bothersome and causes extra work and record keeping on the part of the growers and shippers in the area, it is expected that most all of the agricultural production intended for export from the counties will be able to go to market through normal channels, provided the quarantine regulations are followed. In some cases articles for export are being fumigated—in other cases the way the product is prepared for market permits it free travel through the quarantine line.

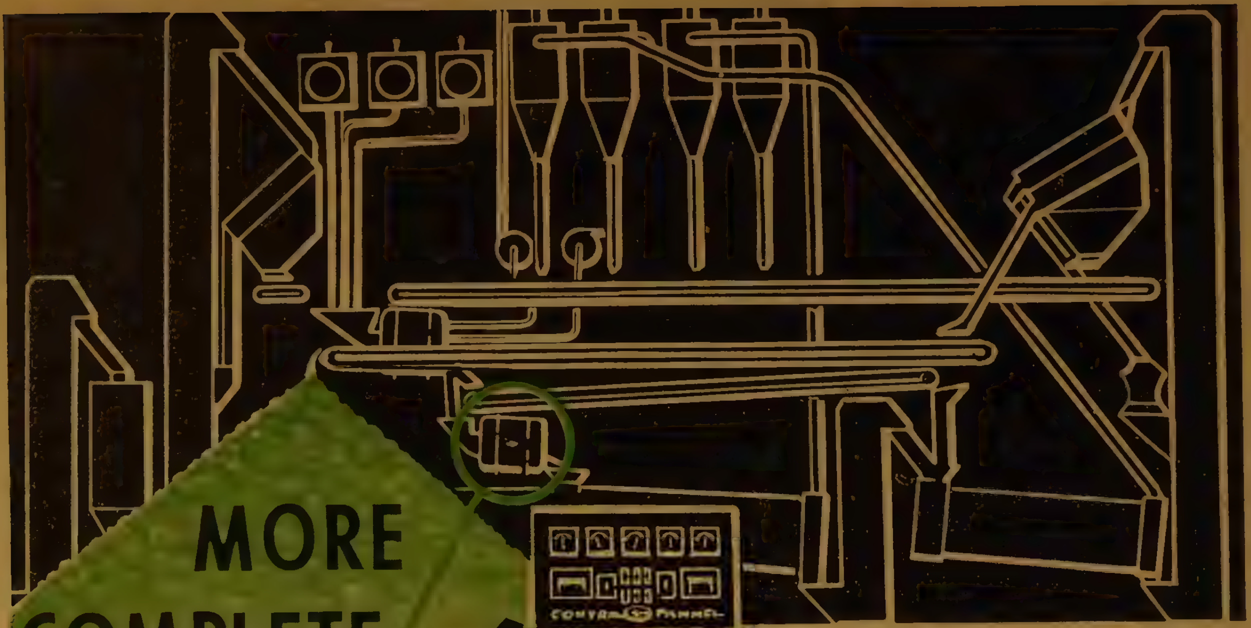
There's considerable speculation as to where and how the Mediterranean fruit fly entered the United States. The nearest outbreak is in Costa Rica. On several occasions it had been urged that our government take cooperative action with the Costa Rican government to eradicate this outbreak. However, for one reason or another such a program has never been undertaken. One reason perhaps is that the United States is the only major citrus producing region of the world which is free from the pest.

While not exactly parallel, it could be noted that the United States is also one of the few major cattle producing areas of the world free of foot and mouth disease. When this disease was found in Mexico, our government spent millions of dollars in a crash program to eradicate the disease. It appears that the program has been successful despite the extreme handicaps and hardships encountered by U. S. agents in penetrating the mountainous regions of Mexico. As a matter of fact our agents braved Mexican gunfire on a number of occasions, but the eradication program continued to its successful completion.

In terms of miles, Costa Rica is much further away than Mexico. In terms of air travel the difference is but a few minutes. There's considerable feeling that the Mediterranean fruit fly entered this country "air mail."

Upon investigation your *Agricultural Chemicals* reporter learned there is no adequate program for the control of insects at many of the major airports in the United States where foreign planes land. There is little doubt that the fruit fly could have entered by plane either from Costa Rica, or from Hawaii or the Mediterranean area itself. Likewise the pest could have come in through shipments of fruit and vegetables by boat. However the biggest block of non-official opinion here looks at the airport as the most likely source of infestation. This is partially bolstered by the fact that the fly is concentrated in areas surrounding the airport.

Both surface sprays and soil treatments are planned as part of the eradication program. The race is on to beat the record of the last infestation, where it took close to three years and seven and a half million dollars to rid the country of the pest. The question is—can we do it?



MORE COMPLETE *Automation* IN *Granular* MIXED GOODS PROCESSING WITH SACKETT "TUNED TO THE TREND" METHODS

Even before the turn of the century, the Sackett Organization was busily engaged in blazing new production trails, many of which have since been followed and accepted as manufacturing standards by the Fertilizer Industry. The fact that our interest in pioneering, over the years, has not lessened is borne out by the fact that the Sackett Organization holds more patents on fertilizer production equipment and methods than all other such manufacturers combined. The last link in this ceaseless effort is the Sackett STAR* Granulator, which is now on the threshold of revolutionizing all existing methods of granulating fertilizers.

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In contrast to the role of the government in the Mediterranean fruit fly outbreak, where materials for control will be purchased by the government and funds expanded to fight the insect field by field, the U. S. Department of Agriculture is advocating that its role in control of the spotted alfalfa aphid be restricted to research alone. This imported insect pest, which has been sweeping over large areas of the Southwest, has caused damage severe enough to arouse Congress. Six or more bills on the subject are now pending action.

Dr. Byron T. Shaw, Agricultural Research Service, U. S. Department of Agriculture, takes the position that the Department of Agriculture's role on spotted alfalfa aphid should be limited largely to research and not to the purchase and application of pest control materials. He fears that if the Department became involved in actual control practices for spotted alfalfa aphid that they would be subject to the same requests from cotton growers, fruit growers, and others who have major pest control problems.

Shaw's position is generally applauded by industry spokesmen despite the fact that direct government intervention would pour large chunks of money into the direct purchase of pesticide chemicals.

This is not to imply that the government's role in the Mediterranean fruit fly control is not considered entirely proper. The direct intervention of the government in that case is aimed at the eradication of the pest and is taken under a different set of circumstances.

Nonetheless it should be noted that if the government really wanted to, it could readily find support for a much more intensive program than it is now undertaking.

* * *

The Food and Drug Administration's position on the use of antibiotics in or on foods is a three stage affair as follows: 1) Okay to use antibiotics in the production of a food product if nothing remains at the time the product is marketed. Antibiotics used to control fireblight on pear trees, tomato wilt, etc. are examples. 2) It's okay to use antibiotics in the preparation of food for market if none remains after the product is prepared for the table. For instance, the use of antibiotics is permitted under certain conditions for processing poultry. Since it's recognized that people cook poultry before they eat it and since cooking destroys the antibiotic, therefore Food and Drug permits it. 3) The Food and Drug Administration does not permit the use of antibiotics when the antibiotic remains after the food product is marketed, cooked, and eaten, or when the product is normally marketed and eaten without cooking. Examples are creampuffs where it's conceivable an antibiotic might have certain advantages but could remain when the product is eaten. Also, how rare is a rare steak—a question which could come up if antibiotics remained in meat products after marketing. The Food and Drug Administration has not agreed to any such uses as yet.

It seems likely, on the basis of past development that additional uses of antibiotics under points one and two will be forthcoming as agricultural science and food processing science develop. On point number three the Food and Drug Administration advises they are maintaining their position.

* * *

A rather interesting extension of the Miller Pesticide Law was made on the use of ammonia gas to control blue mold on citrus. The University of California Citrus Experiment Station is reported to have developed a means of controlling blue mold on citrus by application in tablet form. The tablets release ammonia at a controlled rate and when properly applied the ammonia is dissipated by the time the fruit reaches the consumer. If, however, an over dosage of ammonia has been applied, the ammonia discolors the fruit and renders it virtually unmarketable. The Food and Drug Administration has extended the application of the law in this sense until July 22, 1956.

Another extension was granted on the application of a systemic pesticide known as OMPA for application on walnuts. In this case the walnut growers and the California authorities petitioned the Food and Drug Administration to permit the usage of the chemical during the time of year when aphid outbreaks are particularly bothersome. The Food and Drug Administration is complying in the application for OMPA on walnuts, permitting its use through the middle of this month. OMPA is used rather extensively in England in contrast to its restricted application here in the United States.

* * *

Pesticide manufacturers looking for markets are usually heartened when new uses for their products are found on large acreage crops in contrast to the more intensive use over many years on fruits and vegetables. One of the latest actions of the Food and Drug Administration approving the use of zineb on Durum wheat for the control of rust is but another example. From the long range point of view, our observations are that pesticides will find increasing uses on field crops.

* * *

The pesticide year just completed turns out to be one of the best ever. Dr. Harold H. Shepard, staff specialist, Food and Materials Requirements Division, U. S. Department of Agriculture, recognized throughout the industry for the knowledge and insight he applies to the production of his annual Pesticide Situation, told *Agricultural Chemicals* that his latest report covers a somewhat wider scope and consequently should be of particular interest to industry executives. This report now covers new major infestations such as grasshoppers and timber land projects. "Other additions include," Dr. Shepard continued, "harvest aid chemicals used on cotton, as well as a new section on miticides, plus a bit on organic phosphorus compounds and pyrethrum extract imports."

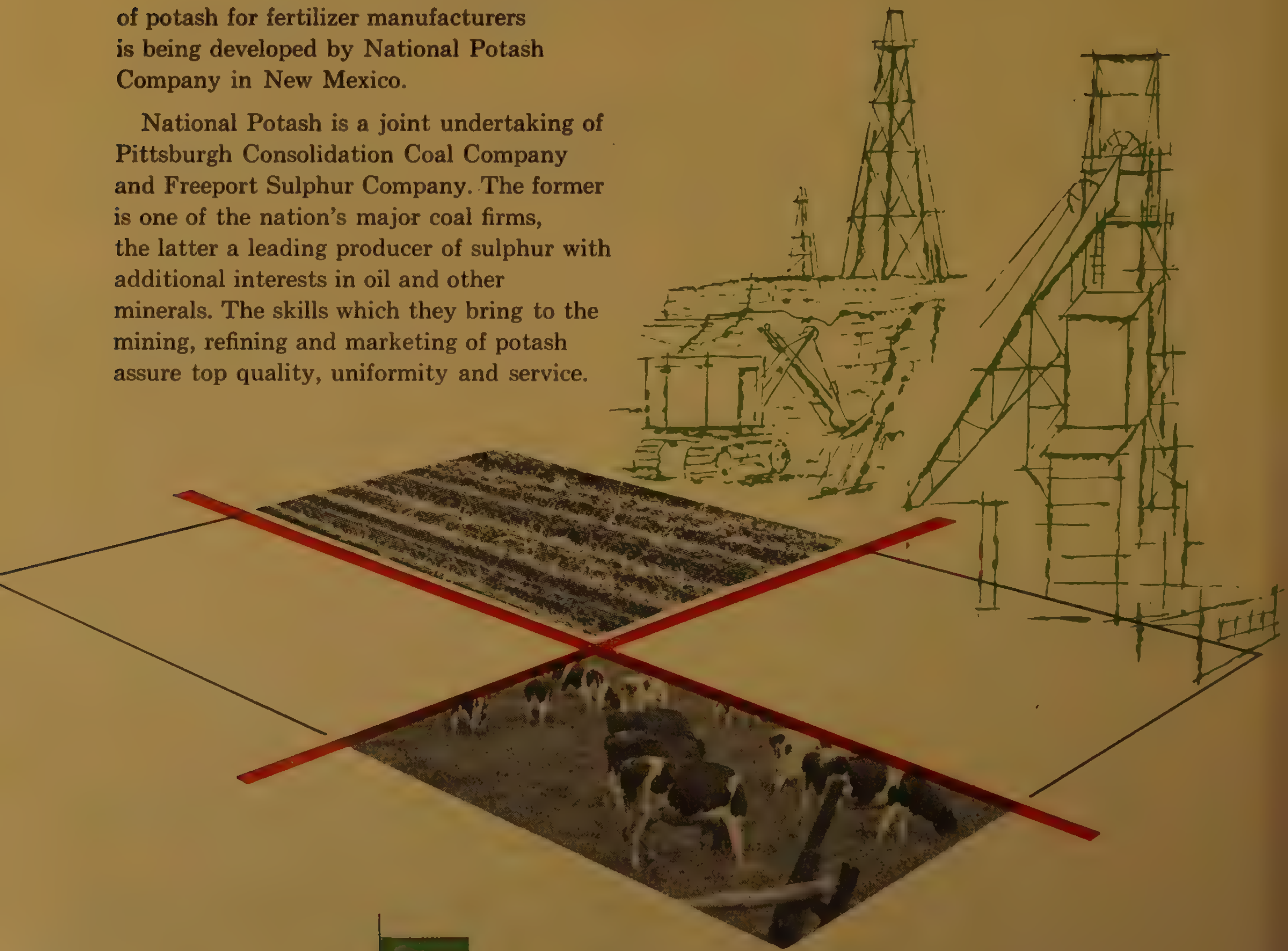
Dr. Shepard continues to apply resourcefulness in the development of this report which each year is finding

(*Continued on Page* 135)

a joint venture in Potash

A new, substantial and dependable source of potash for fertilizer manufacturers is being developed by National Potash Company in New Mexico.

National Potash is a joint undertaking of Pittsburgh Consolidation Coal Company and Freeport Sulphur Company. The former is one of the nation's major coal firms, the latter a leading producer of sulphur with additional interests in oil and other minerals. The skills which they bring to the mining, refining and marketing of potash assure top quality, uniformity and service.



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Technical SECTION

Native Predators of Alfalfa Aphids and Other Pests

WHEN chemical control measures are taken to check alfalfa pests, their possible adverse effect on natural control factors should be considered. For example, parathion as used for the control of the spotted alfalfa aphid is destructive to all of the important predators; however, the lower dosages are less harmful. Usually after three or four days, the parathion has lost its effectiveness and predators start reappearing either through migration into the field or by the hatching of eggs which survived the treatment. Malathion is also very toxic to the predators but is less harmful to some than is parathion. Where big-eyed bugs and damsel bugs are very abundant, sufficient numbers may survive malathion treatments to delay the return of economic aphid populations. Systox reduces lady beetle populations, but most of the other predators survive treatments with this material. In alfalfa seed fields where DDT and toxaphene are used independently, they are moderately toxic to predators; aramite is essentially non-toxic.

Native insect predators and fungus diseases helped to hold the spotted alfalfa aphid in check during the 1955 season in California. In some fields, an actual "epidemic" of a fungus disease prevented damage by the aphid. Lady beetles, hover flies, lacewings, damsel bugs and big-eyed bugs play significant roles in the natural control of the spotted alfalfa aphid. Although these predators do not always prevent economic outbreaks of the aphid, they hold down light infestations, and prevent reinfestation after a chemical control treatment has been applied. Enemies of Spotted Alfalfa Aphid, by Ray F. Smith and Kenneth S. Hagen, *California Agriculture,* April, 1956

•

Pest Control Chemicals

Results of 10 years of Long Ashton research on apple scab conclude that the acaracidal properties of lime sulfur (used as a standard) will cease to be as important in practice, but its ability to check mildew as well as scab will remain a strong asset. Five successive years of good results with captan have been experienced, surpassing lime sulfur in two of these years. Glyodin was found to be about as effective as lime sulfur.

Chlorbenside (p-chlorbenzyl, p-chlorphenyl sulfide) at low rate as dispersible powder or emulsion, gives a 99 percent kill of red spider mite winter eggs when applied at the pink bud stage. Pest Control Chemicals, *Manufacturing Chemist,* Vol. XXVII, No. 2, February, 1956.

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Granular Herbicides

Increased selectivity as compared with the same herbicides in granular form, weight savings (since no water or other liquid is needed) and more effective application are several advantages cited for the use of granular herbicides. Some herbicides which are phytotoxic in spray form may, in granular form, be used to control germinating weed seeds in established crops. Another advantage for the granular or pelletized materials has been demonstrated in control of aquatic weeds in fish ponds, irrigation ditches and drainage canals; the herbicide sinks quickly to the bottom, releasing the effective material near the roots.

Aerial application on sugar cane in Hawaii is being done and California has controlled rye grass in clover successfully for two years with granular herbicides. Pelletized monuron and fenuron applied on mesquite and other woody species has been successful in Texas.

Most promising granular herbicides so far have been IPC and chloro IPC; however, CMU, dalapon, Sesin, Crag, and Natrin have also been studied. *Agricultural and Food Chemistry,* Vol. 4, No. 4., April, 1956.

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New Soil Treatment

Soybean oil meal treated with hydrolyzed polyacrylonitrile results in improved performance from certain types of soil, according to U. S. Patent Number 2,741,551. The combination is said to both condition and fertilize the soil, providing materially improved seed germination, grain yield, aeration and water holding capacity. Manufacturing licenses are being issued to feed and fertilizer producers.

•

Phosphate Study Reported

Based on results of fertilizer trials now completing their second year in the Meloland area of California, phosphate fertilizers have markedly increased yield of several vegetable crops.

During the first year, lettuce and carrots gave progressively better yields with higher phosphorus applications, up to 180 lbs. of actual P_2O_5 per acre, the heaviest application in the test. Cabbage and onions responded best to the initial application of 60 pounds P_2O_5 per acre. Cantaloupes did best on 120 pounds per acre.

O. E. Lorenz, in reporting these results to the California Fertilizer Conference said that the cabbage was a complete failure on the non-fertilized plot, and that the lettuce crop was a failure also, without phosphate treatment. Fourth Annual California Fertilizer Conference, April 16, Riverside, Calif.; reported by O. E. Lorenz, Professor of Vegetable Crops.

New Bioassay Method

The need for sensitive and simple analytical methods for the determination of insecticide residues became more acute when new legislation was passed recently, governing the use of insecticides. Using the larvae of the mosquito species, *Culex quinquefasciatus* a bioassay method has been developed in which most of the chlorinated hydrocarbons and several of the organic phosphates can be determined with greater sensitivity than with existing chemical methods. Levels as low as 0.02 ppm can be measured it is said.

Using this bioassay technique, untrained personnel can handle from 6 to 12 samples per day, results being obtained in 24 hours. The method has been used on such crops as potatoes, carrots, onions, beans, broccoli, strawberries, alfalfa, and on soils. A Simplified Bioassay for Insecticide Residues, by L. C. Terriere and Ulo Kiigemagi, Agricultural Chemistry Dept., Oregon State College; paper presented at Division of Agricultural and Food Chemistry meeting, American Chemical Society, Dallas, April, 1956.

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Sulfur for Erinose Mite

The erinose mite, *Aceria litchii*, one of the important pests of the lychee in Hawaii, is effectively controlled by applying wettable sulfur at a rate of 5 pounds per 100 gallons of water at a time of the emergence of new growth. Two or three additional treatments at monthly intervals may be neccessary for effective control. The Erinose Mite of Lychee by T. Hishida and F. G. Holdaway, Hawaii Agricultural Experiment Station, Circular 48.

•

Soil Fumigation in N.J.

Preplant treatment with a soil fumigant to control nematodes has been successful in vegetable growing areas of New Jersey. In Woodstown, carrot growing had reached a point where little or no profit was being made due to the inroads of nematodes. Soil fumigant D-D (Shell Chemical Co.) was injected beneath the surface of the soil with a pressure applicator to a depth of 6-8″ at the rate of 20-22 gallons per acre. Shanks were placed 12″ apart.

Results showed the treated area yielding 22 tons per acre and the untreated area 7 tons per acre. Many more of the carrots in the treated plots fell in the No. 1 grade. Similar results have been reported on sweet potatoes and asparagus. *Market Growers Journal*, Feb., 1956.

•

Iron Deficiency in Roses

Chelated iron and a chelating agent, used at the rate of 0.80 ounces of iron chelate per 100 square feet, are effective in correcting iron deficiency symptoms of roses and gardenias, according to recent observations in New England.

Chlorotic rose plants which received soil applications of iron chelate or the chelating agent responded by regaining normal green color within 3 to 7 weeks after treatment. The chelated form of iron used was monosodium ferric ethylenediamine tetraacetate dihydrate, containing 12 percent metallic iron as Fe. Chlorosis of Greenhouse Roses and Gardenias Corrected by Use of Chelated Iron and a Chelating Agent, by Harold E. White. *Down to Earth,* Vol. 11, No. 4, Spring, 1956.

•

Cotton Seed Chem. Treatment

In recent grower trials, plantings of coton seed, from which lint was removed with acid, have shown a 48 percent increase in stand when the seed was properly treated with "Granosan" M seed disinfectant. With fuzzy seed or seed from which lint was removed by machine, stands have been increased 23 percent. A report from Oklahoma State authorities showed a seven-year average of 10.8 percent better stand from seed treated with "Granosan" M.

Treatment with the chemical as a slurry is usually done by a ginner or commercial treater, but there are still a good many applications made using a hand-operated, barrel-type treater. About 1½ ounces of chemical are needed per bushel of fuzzy cotton seed.

Sweet Clover Weevil

Farm advisers and entomologists have been receiving inquiries about controlling sweet clover weevil with granular dieldrin and heptachlor as the result of an article in a farm magazine. The following information will help to answer some of these questions:

Results of three field trials conducted in Iowa with these two insecticides in granular form have shown control to be comparable to that obtained with a DDT spray, which is presently recommended for this pest. The granular insecticide was applied with the seed in one operation, which is an advantage. Although this is a prophylactic control measure, and as such is not always necessary, it may be the answer to the sweet clover weevil problem.

In the Iowa tests, 25 percent heptachlor and 15 percent dieldrin were each used in a carrier of RVM (attaclay) of 30-60 mesh particle size. Both materials were applied at dosages of ¼ pound and ½ pound per acre of actual insecticide. The insecticides were applied in two ways: one was mixed with the seed and applied with either a drill or an endgate seeder; the other was applied separately from the seed with a hand grass seeder on the day after oats and sweet clover were seeded. Good control was obtained with all three methods and with dosages of ¼ to ½ pound of insecticide per acre.

Our control recommendations to date have included both cultural and chemical measures (Sweet Clover and Sweet Clover Weevil, NH280). Cultural controls include (1) fall-plowing to eliminate hibernating quarters, (2) not placing a new seeding adjacent to an old stand, (3) planting mixtures, and (4) increasing seeding rates of sweet clover when used alone.

DDT applied as a spray at 1½ pounds per acre when the plants show 50 percent notching by sweet clover weevils will give effective control, and that is what we now recommend. The use of granular insecticides to control sweet clover weevil is suggested for trial on the basis of the three field trials discussed above.

Sodium: Partial K Substitute

Sodium may not be classed as an essential plant food element; however, enough data has been accumulated since the value of sodium in cotton production was first being recognized in 1942, to conclude that the application of sodium to a soil extremely deficient in potassium will improve the growth and vigor of the cotton plants and reduce the severity of potash deficiency symptoms. Also, it will increase the yield of seed cotton, and if the sodium is added in sufficient quantities it may substitute for as much as one fourth of the potassium required for maximum yields of cotton. Sodium a Partial Substitute for Potassium Under Cotton on Potash Deficient Soils, by Dr. C. Dale Hoover, *Chilean Nitrate Farm Forum* March, 1956.

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Systemics on Ornamentals

Results of more than two years of research on ornamental pests done by the Alabama Polytechnic Institute Agricultural Experiment Station have shown the following results:

(1) Of six systemics tested, demeton (Systox) and Compound 21/116 (related to Systox) were the most effective, and controlled tea and camellia scale, azalea lace bugs, whiteflies, and thrips.

(2) Best mixture rate was found to be 1 teaspoon of 50 percent emulsifiable concentrate of either compound to 1 gallon of water.

(3) Best results were obtained from two applications 30 days apart.

(4) Plants were found free of scale as long as three months after application.

(5) Applications of the mixture to the soil were equally as effective as applications to plant foliage; they may be applied any time.

(6) In applications to soil, the best results were obtained from applying a half pint of mixture to soil around base of plants 18 to 24 inches tall. Larger plants required larger amounts.

(7) Where sprays were used, a thorough wetting was necessary.

(8) To obtain control of Spider mites it was necessary to double the dosage rate (2 teaspoons to 1 gallon of water) of demeton or Compound 21/116 applied either to soil or foliage.

Systemic—A New Approach to Fighting Ornamental Plant Insects, by B. Wayne Arthur, Alabama Polytechnic Institute, Highlights of Agricultural Research, Vol. 2, No. 1.

•

High Ammonia Level Toxic

Poor growth and possible injury to certain plants due to high ammonia nitrogen levels appears most likely to occur in acid soils low in nitrates. Presence of nitrates seems to decrease toxicity, as indicated in a series of experiments recently completed by Dow Chemical Co. It is suggested that with plants of known or questionable ammonia sensitivity, nitrate fertilizers be used when the soil is fumigated with Dowfume MC-2. Fertilizers containing both ammonia and nitrate nitrogen may be used safely at times. Effect of Soil Fumigation on Nitrification, by B. J. Thiegs, *Down to Earth*, Dow Chemical Co., Summer, 1955.

Cost-Saving in New L.A. Plant

Stauffer Chemical Co.'s new fertilizer mixing plant in Los Angeles does not have brand new operations or procedures; however, several labor-saving wrinkles have combined to make the plant an example of cost-saving through use of modern techniques.

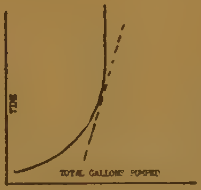
Extensive use of automatic conveying equipment has helped cut labor requirements to less than 0.1 man-hour/ton. The production rate is 30-40 tons/hour.

A system of interlocking electronic controls feeds solid raw materials from five storage hoppers to a conveyor belt. The adjustable weighing system can be set to deliver 25-350 lbs./dump to the belt at the rate of one dump every 15, 20, or 30 seconds.

One unusual feature of the plant is its electrostatic precipitator. Built to the company's own specifications it is the first such device to meet the Los Angeles Air Pollution Control Board's rigid regulations for fertilizer plants.

. . . . *From the Superintendent's Notebook*

PRACTICAL suggestions for production personnel, gleaned from actual experience. It is hoped to have contributions to this column from readers. Production men are invited to send in practical items of this kind which may help other men engaged in production work. Send to Ag Chem., Caldwell, N. J.



Graph Gives Pumping Rate

Quite a few sulfuric acid plants are designed today so that the acid coolers drain back into the pump tank, and of course the acid flowing over the towers likewise drains into the same tank. It is rather difficult to measure the pumping rate, since the rate drops off as the coolers fill up, and as soon as the coolers are full, return acid from the towers starts to flow back to the pump tank.

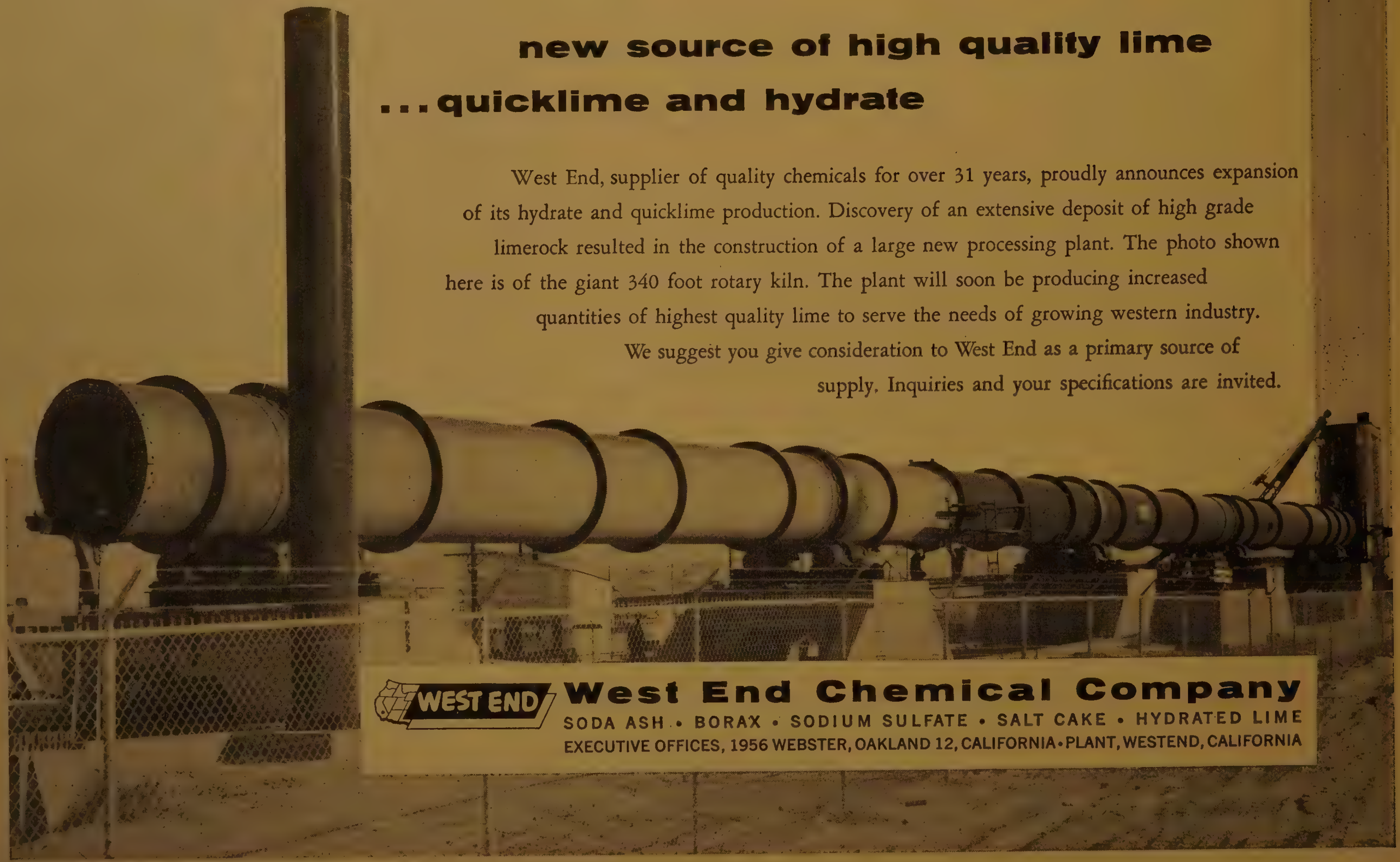
By plotting total gallons pumped from the pump tank as abcissa versus time from the instant the pump was started as the ordinate, you get a curve which is concave upward and breaks sharply to a straight vertical line. The slope of the tangent line just before the break point will give a good approximation of pumping rate. Volume readings should be taken every 15 seconds or so for about a minute before the break point. A continuously reading tank gauge is essential.

Submitted by W. Davis, plant superintendent, Davison Chemical Co.

new source of high quality lime

...quicklime and hydrate

West End, supplier of quality chemicals for over 31 years, proudly announces expansion of its hydrate and quicklime production. Discovery of an extensive deposit of high grade limerock resulted in the construction of a large new processing plant. The photo shown here is of the giant 340 foot rotary kiln. The plant will soon be producing increased quantities of highest quality lime to serve the needs of growing western industry. We suggest you give consideration to West End as a primary source of supply. Inquiries and your specifications are invited.



WEST END **West End Chemical Company**
SODA ASH • BORAX • SODIUM SULFATE • SALT CAKE • HYDRATED LIME
EXECUTIVE OFFICES, 1956 WEBSTER, OAKLAND 12, CALIFORNIA • PLANT, WESTEND, CALIFORNIA

CSMA Discusses Pesticides

THE mid-year meeting of the Chemical Specialties Manufacturers Association was held at the Hotel Drake, Chicago, May 20-22. Reporting on sale of insecticides for the year 1955, George W. Fiero of Esso Standard Oil Co. indicated a big gain in the movement of livestock emulsion concentrate. The total for 1955 was 221,715 gallons, an increase of 71% over the 1954 total of 129,769 gallons. Livestock wettable powders, however, continued their downward trend. From a high of 3,565,801 pounds in 1953, and 2,328,743 pounds in 1954, they dropped to 1,827,707 pounds in 1955.

Package livestock oil base sprays gained moderately in 1955,—up about 4% to 926,275 gallons from the 1954 total of 891,750 gallons. Bulk sales decreased, however, dropping from 1,071,434 gallons in 1954 to 874,318 gallons in 1955, some 18%.

Sales of cattle smears and other screw worm remedies were reported as 273,030 units in the CSMA survey, an increase of 120% over the 1954 figure of 124,306.

George B. Wagner, Pillsbury Mills, Inc., Minneapolis, in an address before the Insecticide Division of the Association asserted that the economic losses caused by stored grain and flour insects can be reduced by intelligent control programs. The problem of control of numerous pests of stored grain has been made more acute in recent years, he noted, by the increasing inter-relationship between various phases of the food industry. Today's prepared foods often consist of flours, shortening, nuts, dried fruits, chocolate and various other additions. As a result, many pests that have in the past been considered primarily as grain feeders, have learned to prefer other foods, and have widened the range of stored products which they attack.

Resistance of Insects to Insecticides . . . A National Problem" was the title of an address by C. H. Hoffman, USDA, Entomology Research Branch, who observed that "Resistance may originate in several ways and be intensified by combined larval and adult selection. Of outstanding significance is that development of tolerance to a given insecticide seems to predispose an insect to rapid development of resistance to other insecticides, particularly those closely related structurally." Mr. Hoffman repeated the standard solution to controlling resistant pests, suggesting that alternate materials (other than that to which resistance has been developed) be used until better control measures are worked out.★

Industry Patents

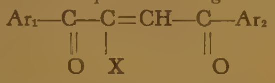
The data listed below is only a brief review of recent patents pertinent to the readers and subscribers of this publication.

Complete copies of these patents may be obtained by writing to the publisher of this magazine and remitting 50¢ for each copy desired. For orders received outside of the United States the cost will be $1.00 per copy.

2,726,150. HERBICIDAL COMPOSITION AND METHOD OF MAKING SAME. Patent issued December 6, 1956 to Frederick J. Wolter, Wilmington, Del., assignor to E. I. du Pont de Nemours and Co., Wilmington, Del., a corporation of Delaware. A fluid herbicidal composition comprising an emulsion containing an organic liquid phase, a water phase, an emulsifying agent in amount sufficient to impart water dispersibility to the composition, and dispersed in said emulsion as an essential herbicidally active ingredient a particulate phenyl alkyl urea the particles of which have an average size less than 5 microns, said organic liquid being a water immiscible liquid in which the urea has a solubility less than about 0.1% at 30°C. and having a viscosity greater than about 25 S. U. S. at 100° F.

2,726,949. COMPLEX FERTILIZER AND METHOD OF PRODUCING SAME. Patent issued December 13, 1955 to Louis E. Andres, Saint Gratien, and Bernard J. Quanquin, Grand-Couronne, France, assignors to Potase & Engrais Chimiques, Paris, France, a societe Anonyme of France. A method of producing a complex fertilizer from water insoluble phosphate rock containing phosphorus and calcium which when calculated as P_2O_5 and CaO may be represented by the formula $P_2O_5\ (CaO)_x$ where x represents the numerical value of mols of CaO to each mol of P_2O_5 in said rock which method comprises reacting said rock phosphate with nitric acid in sufficient amount to form a slurry in which all the phosphate is converted to phosphoric acid form which is water soluble, then adding sufficient ammonia to said slurry to adjust its pH to about 3, then gradually adding to the resulting slurry sulphuric acid in an amount equivalent to x—2 mols of H_2SO_4 for each mol of P_2O_5 present in the slurry and simultaneously while adding said sulphuric acid also adding ammonia gradually in an amount and at a rate and in a ratio to the sulphuric acid to cause the pH of the slurry gradually to rise to a pH of about 5, and then adding sufficient ammonia alone to the slurry to raise the pH of the slurry to the neighborhood of 5.5 to 6.5 thereby to convert any existing monocalcium phosphate to diclacium phosphate and avoiding the formation of unwanted tricalcium phosphate and then drying the slurry.

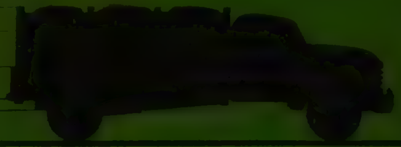
2,731,381. PESTICIDAL COMPOSITIONS AND THEIR USE. Patents issued January 17, 1956 to Jack S. Newcomer, Grand Island, N. Y., assignor, by mesne assignments, to the Pennsylvania Salt Manufacturing Company, Philadelphia, Pa., a corporation of Pennsylvania. A composition prepared for use in combating microorganisms comprising a surface active agent, and a compound having the formula



$$Ar_1-\underset{O}{\underset{\|}{C}}-\underset{X}{\underset{|}{C}}=CH-\underset{O}{\underset{\|}{C}}-Ar_2$$

wherein each of Ar_1 and Ar_2 represent an aryl radical selected from the group consisting of phenyl, biphenylyl, terphenylyl and naphthyl radicals, said radicals having from 0 to 3 substituents selected from the group consisting of halogen and alkyl radicals containing less than six carbon atoms; and wherein X represents halogen.

2,730,432. APPARATUS FOR THE MANUFACTURE OF SUPERPHOSPHATE AND THE LIKE. Patent issued January 10, 1956 to Jean Moritz, Chatou, France. Apparatus for the continuous manufacture of superphosphate and like products, comprising: a vat consisting of a stationary peripheral wall and a revoluble bottom, an upper platform closing the vat at the top and integral with the said stationary wall, a rotatable mandrel located at the centre of the vat and integral with the revoluble bottom, means for imparting rotation to the bottom of the vat and to the mandrel, means for introducing into said vat fluid starting materials for the production of superphosphate and like products, a flexible covering forming a substantially fluid-tight sliding joint between part of the lower edge of the stationary peripheral wall of the vat and the revoluble bottom of the vat, a rotatable detaching device positioned within said vat to break up and detach the product after it has solidified; and an aperture in said stationary wall for the discharge of the broken-up product.



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MEETING CALENDAR

June 5-6 — North Central Division of the American Phytopathological Society, Kansas State College, Manhattan, Kans.

June 10-13 — National Plant Food Institute. The Greenbrier, White Sulphur Springs, West Virginia.

June 20-22 — American Society of Agronomy, Northeast Branch, Summer Meeting, University of Maryland, College Park, Md.

June 26-28 — Entomological Society of America, Pacific Branch, Hotel Claremont, Berkeley, Cal.

June 28-30—Association of Southern Feed & Fertilizer Control Officials, Hotel Roanoke, Roanoke, Va.

June 28-30—Pacific Northwestern Plant Food Assoc. Chinook Hotel, Yakima, Wash.

June 30 — Del Mar Va Peninsula Fertilizer Association, annual convention, Ocean City, Md.

July 4-8—Eastern Canadian Plant Food Prod. Conf., Trembland Lodge, Mt. Tremblant, Quebec, Canada.

July 12 — Annual South Carolina Fertilizer meeting and tour of the Edisto, Experiment Station, Blackville, S. C.

July 18-20—Southwestern Fertilizer Conf. and Grade Meeting, Bucaneer Hotel, Galveston, Tex.

Aug. 15—Connecticut Agricultural Experiment Station Field Day, Mt. Carmel, Conn.

July 25-27—Northwest Association of Horticulturists, Entomologists and Plant Pathologists Conf., Northwest Washington Experiment Station, Mt. Vernon, Wash.

August 1—Kentucky Fertilizer Conference, Guignol Theatre, Univ. of Kentucky, Lexington.

August 14-15 — Ohio Agricultural Pesticide Meeting, Ohio Agricultural Experiment Station, Wooster, Ohio.

August 17-25 — 10th International Congress of Entomology, McGill University and University of Montreal, Ottawa, Canada.

July 19 — Cornell Weed Day, a tour of the departments of agronomy and vegetable crops at Cornell University, Ithaca, N. Y.

Aug. 22-24—Beltwide Cotton Mechanization Conf. Atlanta Hotel, Atlanta, Ga.

Sept. 11-14 — Packaging Machinery & Materials Exposition of 1956, Public Auditorium, Cleveland.

Oct. 4-5—Iowa Pest Control Association, Des Moines, Ia.

Oct. 14-15—International Sanitation Maintenance Show and Conf. City Coliseum, New York City

Oct. 15—Chemical Sales Clinic, Hotel Commodore, New York City

Oct. 16-17—National Nitrogen Solutions Assn, annual meeting and trade show, City Auditorium, Sioux City, Oa.

Oct. 16-18—Fertilizer Industry Round Table, Shoreham Hotel, Park Room, Washington, D. C.

Oct. 19—Control Officials Association, Shoreham Hotel, Washington, D. C.

Oct. 22-25—National Pest Control Association, Sheraton - Cadillac Hotel, Detroit, Mich.

Nov. 2—Fertilizer Industry Work Conference, Atlanta-Biltmore Hotel, Atlanta

Nov. 11-13—California Fertilizer Association, Cronado Hotel, Coronado, Calif.

Nov. 18-20—Midwest Garden Show, Navy Pier, Chicago.

Nov. 19-20 — Entomological Society of America, Eastern Branch, Hotel Haddon Hall, Atlantic City, N. J.

Dec. 27-31 — Entomological Society of America, national meeting, Hotel New Yorker, New York City.

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The leaf shown above is infested with aphids. These tiny sap-sucking insects seldom move more than a few inches a day. This sluggishness and their manner of feeding require the deposition of a contact insecticide *on* these hard-to-kill insects. Coverage of the entire plant surface is necessary for adequate control.

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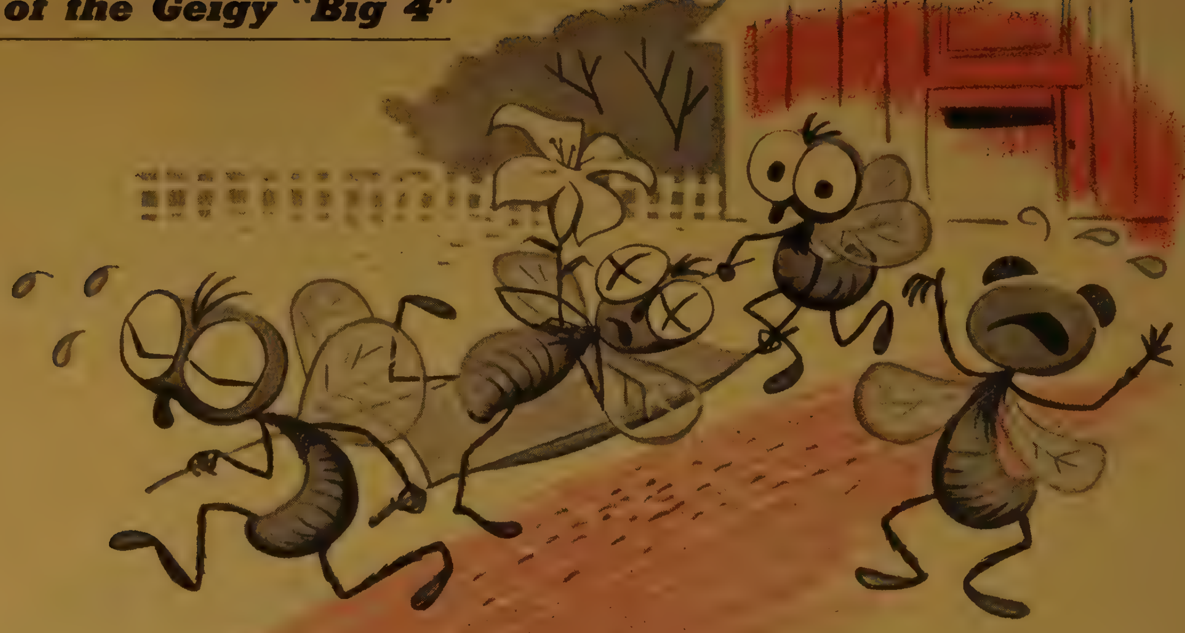

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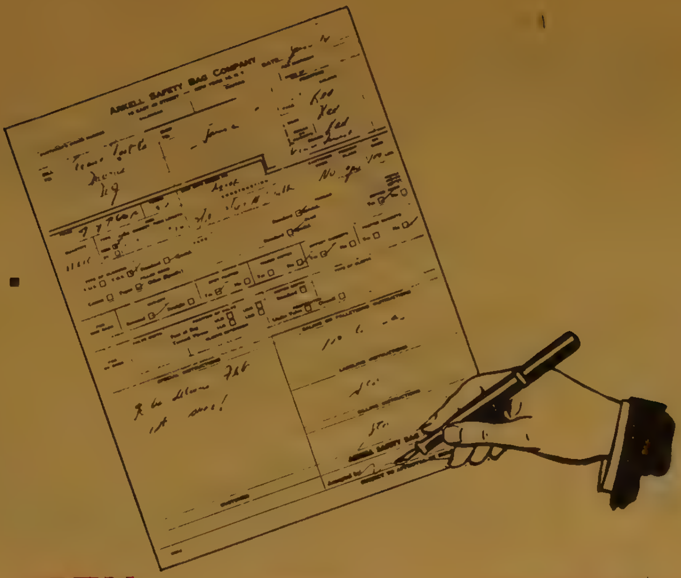

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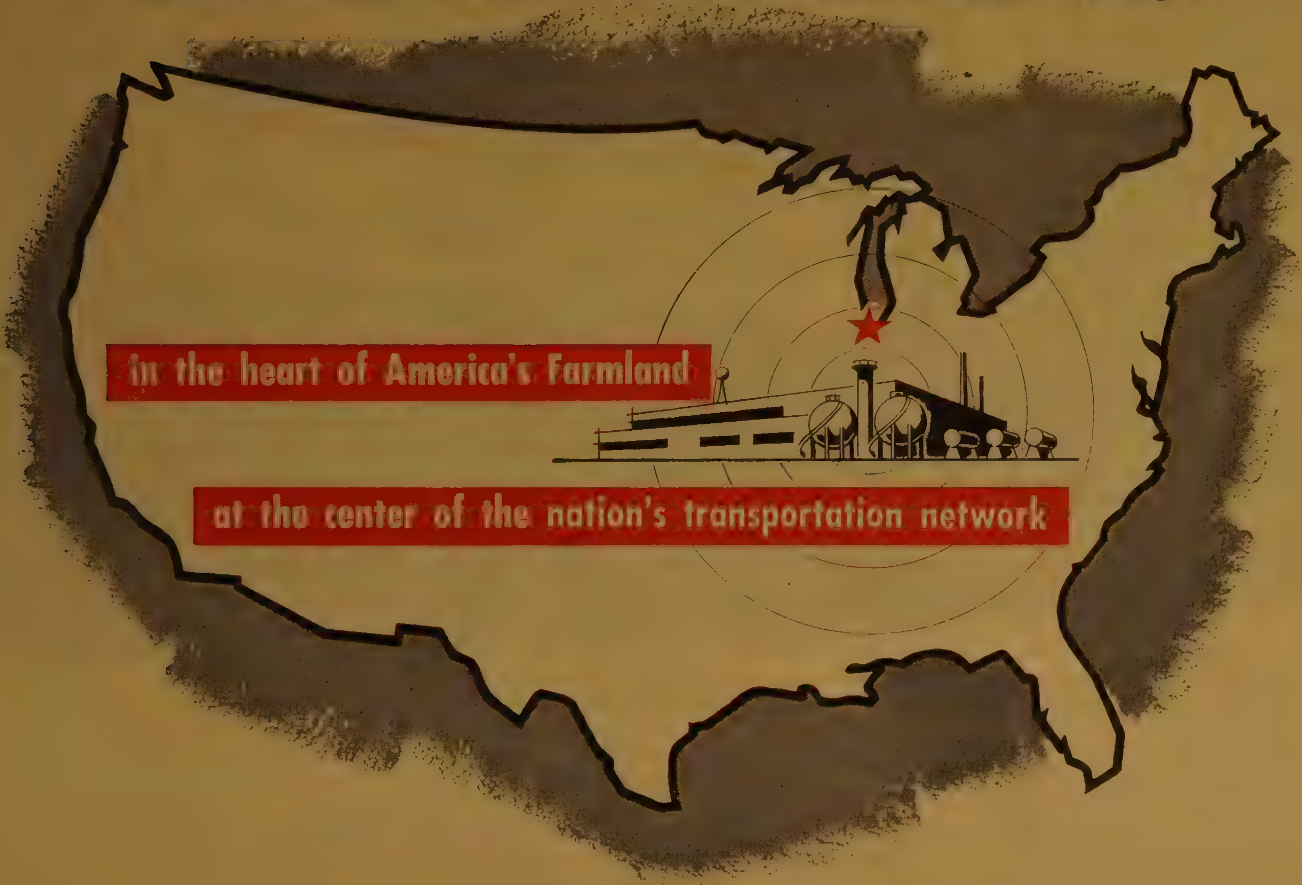
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"HORSE & LION" Calcium Nitrate: 15½% pure nitrogen, combined with about 20% available lime. Granulated.

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"HORSE & LION UREA 44": 44% pure nitrogen. Coated pellets for dry use.

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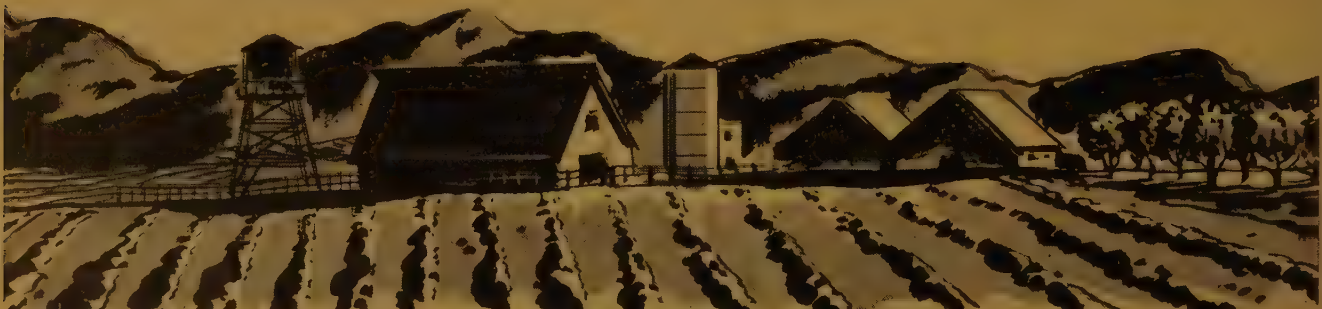

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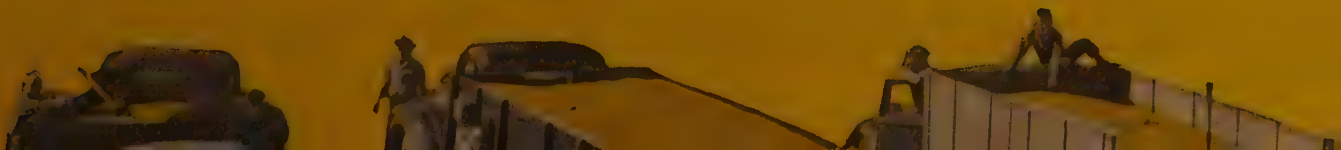

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EVERY YEAR the use of aldrin, dieldrin, and endrin grows by leaps and bounds. Growers are acting on the experience of other growers; using more and more aldrin, dieldrin, and endrin for the control of pests on cotton, corn, tobacco, vegetables, small grain and other crops.

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INDUSTRY News

US Experts on British Program

The Plant Protection, Second International Conference will be held June 18-22 at the Fernhurst Research Station, England. The conference is being sponsored by Plant Protection Ltd., a division of Imperial Chemical Industries.

Dr. W. F. Hanna, Chief Division of Botany and Plant Pathology, Dept. of Agriculture, Ottawa, Canada; Dr. R. L. Metcalf, Dept. of Entomology, University of California and S. E. A. McCallan, Boyce Thompson Institute for Plant Research, Inc., Yonkers, N. Y., have been invited to present the main papers at the conference. The papers will be presented in the sessions on "Genetics in Relation to Crop Protection", "The Role of Systemics in Crop Protection," and "The Mechanisms of Toxicity."

Following the conference the three men will visit various English agricultural experiment stations. The first conference was held in 1951.

•

Connecticut Field Day, Aug. 15

Date of the Connecticut Agricultural Experiment Station Field Day has been changed to August 15. The Field Day is held at the Station's 55-acre experimental farm in the Mt. Carmel section of Hamden.

With J. Peter Johnson, as chairman, a committee is now planning the program, which includes an address, exhibits, and the popular tractor tours to experimental plots.

"We can show on Field Day only a small part of the work underway," advises Neely Turner, vice director of the station. "Within the broad limits of the station as a center of plant science research, we try to present a living report to our 'stockholders', the people of Connecticut and the Northeast. We always welcome suggestions from those who have attended our Field Days in the past."

•

Velsicol Advances Richardson

F. E. Richardson has been named plant manager of the Memphis plant of Velsicol Chemical Corp. He had been assistant plant manager since last November.

The Velsicol Memphis plant produces technical heptachlor and endrin insecticides along with such basic chemical products as chlorine, caustic soda, hydrogen and sodium hypochlorite.

•

Airplane Test at Torrance

The Ag-2 plane designed for aerial application of agricultural chemicals will be tested sometime in June at Torrance Municipal Airport, Torrance, Calif. The plane is designed to handle a payload exceeding 2000 lbs. (all dust in a 53 cu. ft. hopper, or 250 gallons of liquid in ground accessible wing tanks, or combinations of solids and liquids). It will be put into production by the Ag-2 Transland Co. of Torrance, Calif. Sales will be conducted through direct franchised dealers in a program already in effect.

The test being held in June is designed to qualify for C.A.A. Part III Flight and Static tests.

•

Mid South NH_3 Barges

Two specially constructed barges for transporting "Big N" anhydrous ammonia fertilizer were placed in service last month by Mid-South Chemical Corp., Memphis. The barges have a capacity of approximately 1,000 tons each.

Fertilizer Round Table

The 1956 Industry Fertilizer Round Table, organized and directed by Vincent Sauchelli, Davison Chemical Co., will be held October 16-18 at the Shoreham Hotel, Washington, D. C.

To arrange a program of particular interest to fertilizer manufacturers, Dr. Sauchelli is making a survey of the fertilizer industry, requesting an indication of preference of some 14 topics of current interest suggested for discussion. The topics deal with instrumentation and quality control in granulation; air pollution; materials specifications; packaging equipment; manufacture of liquid fertilizers; research and manufacturing integration; etc.

It is suggested that members of the fertilizer industry receiving the questionnaire, submit their replies promptly so that the program committee may take full advantage of industry preference.

•

Cornell Weed Day, July 19

The second annual Cornell Weed Day conducted jointly by the Departments of Agronomy and Vegetable Crops at Cornell University, Ithaca, NY, will be held July 19, 1956. The Weed Day is primarily a tour of weed control research plots of the two sponsoring departments. It is intended for technical representatives of chemical companies and experiment station personnel engaged in weed control research.

•

IMCC Ahead of Schedule

New facilities for doubling the present output of dicalcium phosphate at the Bonnie plant of International Minerals & Chemical Corp. will be in operation six months ahead of schedule, according to an announcement by Howard F. Roderick, vice president of the Phosphate Chemicals Division. The Bonnie plant, located near Bartow, Florida, is the world's largest facility for the manufacture of dicalcium phosphate and is one of three plants producing feed phosphates in the company's Phosphate Chemicals Division.

Expand Triazole Production

North American Cyanamid Co., Ltd. has begun construction of facilities for the production of amino triazole, a new herbicidal defoliant chemical. The Canadian firm is a subsidiary of the American Cyanamid Co.

The new facilities will be located at Cyanamid's Welland Plant, Stamford Township, Niagara Falls, Ontario, where ammonium nitrate and nitrogen solution fertilizers are manufactured for the company's agricultural chemicals division.

New La. Ammonia Plant

Plans for construction of an estimated \$12.5 million petrochemical plant at Lake Charles, La., to produce anhydrous ammonia for use primarily as a fertilizer were recently announced by Petroleum Chemical, Inc., which is owned jointly by Cities Service Co. and Continental Oil Co.

The plant will produce 100,000 tons of ammonia annually. Construction is scheduled for completion in the fall of 1957.

The ammonia will be marketed as fertilizer by Mid-South Chemical Corp., Memphis which is also owned jointly by Cities Service and Continental.

New Shea Division

Consolidation of all agricultural sales was announced recently by the Shea Chemical Corp. The new division will be headed by H. E. Frederick, vice president. Errol F. Cook becomes nutritionist, and William J. Barrett, technical sales engineer.

Chief duties of the group will be to direct the Shea firm's sales to the feed and fertilizer industries. Products sold to animal and poultry feed manufacturers include dicalcium phosphate and phosphate feed solution. Both are manufactured from elemental phosphorus and supply high purity phosphorus in readily assimilable form for addition to mixed feeds, officials said. The Shea firm is one of the nation's largest suppliers of phosphates for feed.

The corporation supplies phosphoric acid to the fertilizer industry, both for the production of enriched superphosphate and for the manufacture of liquid fertilizer. It also markets a phosphate-potash ash which is a by-product of elemental phosphorus production.

Niagara Appoints Rude

Niagara Chemical Division of Food Machinery and Chemical Corp. and Quimica Niagara de Mexico, a wholly owned subsidiary, announced recently the appointment of Clifford S. Rude to the staff of Quimica Niagara de Mexico. Mr. Rude will be in charge of experimental testing and development work in Mexico, reporting directly to R. N. Alden, general manager of the Quimica Niagara operation.

Mr. Rude comes to Niagara after a long and productive career in agricultural entomology during which he was employed by the Bureau of Entomology, U.S.D.A., and by several states in the Southwest cotton producing area.

Although his retirement from the Bureau of Entomolgy became effective early this year, Mr. Rude will continue to be of service to the cotton industry both in Mexico and in this country through his continuing studies of insect problems related to cotton for Quimica Niagara de Mexico.

Pesticide Tolerances Issued

Washington Agricultural Experiment Stations have issued a booklet titled "Federal Pesticides Tolerances" for persons directly concerned with pest control tolerances. The summaries contained in the booklet cover all pesticides used in Washington for which tolerances have been established or exempted.

Okla. Dealers and Crop Conf.

The Oklahoma Fertilizer Dealer Conference will be held in conjunction with the annual Oklahoma Soils and Crops Conference on November 28-29 at Oklahoma A & M College, Stillwater, Okla. The dealers conference is sponsored by the Oklahoma Plant Food Educational Society for the purpose of discussing agronomic information and better ways to promote and merchandise agricultural chemicals by the dealer. The program committee met recently to discuss and plan for the 1956 conference.

Ag. Chemicals Use Growing

Widening farmer recognition of the value of chemicals, not only in protecting crops, but also in cutting farm labor costs was one of the reasons cited recently by agricultural chemicals producers in predicting a continuous sales growth for chemicals.

Producers also noted the research progress and stepped-up flow of newer, more effective pesticides, weed killers, fungicides and similar products. Farmer recognition of the value of agricultural chemicals is evidenced by the increase in sales in these products from \$40 million in 1939 to the present \$200 million a year.

Potash Deliveries Drop

The American Potash Institute last month reported 1,114,439 tons of potash salts containing an equivalent of 656,580 tons of K_2O was delivered during the first quarter of this year by the seven major American producers. This represents a decrease of nearly 3 percent from the like period in 1955.

Pennsalt Expansion in Mexico

Pennsylvania Salt Manufacturing Co. announced recently further expansion of its operations in the Republic of Mexico. Nearing completion at Navojoa, Sonora in the northwestern area is a new agricultural chemical processing plant and distribution center. This plant provides an expansion of Pennsalt de Mexico's central plant and office facilities in Mexico City and establishes another base for the eventual distribution of the company's line of more than 400 chemicals for industrial, farm and home use in the rapidly expanding economy of the west coast of Mexico.

Late in May, Minerales y Metales Industriales, another subsidiary in Mexico will complete its first year of fluorspar mining activities in the San Luis Potosi area. Operating abroad as Pennsalt International Corp., Philadelphia, the company also has growing exporting, importing, and manufacturing interests throughout Central and South America.

Weed Session at Rutgers

A special meeting, arranged for dealers in weed-killing chemicals and their representatives, custom operators who specialize in weed killing and farmers who have weed problems, was conducted at the College of Agriculture, Rutgers University, New Brunswick, N. J., May 16.

Training in weed identification and control was offered along with a demonstration on how to preserve specimens. William G. Harden, Rutgers extension agent in farm engineering, discussed pumps and other machinery used in controlling weeds.

Claude Phillips, University of Delaware, gave practical aids in weed identification.

•

Hitchner Addresses FDA Conf.

More and more the public is demanding a clean, safe and healthy food supply, L. S. Hitchner, Executive Secretary of the National Agricultural Chemicals Association, declared in a speech at the 60th annual conference of the Association of Food and Drug Officials of the United States.

Stating that the growing interest of the public in safe foods is a healthy development, Mr. Hitchner said, "Insofar as pesticides are concerned, the public is assured of their safety if directions for use are followed."

The Miller Amendment to the Food, Drug and Cosmetic Act, which the agricultural chemicals industry supported, requires manufacturers to thoroughly pre-test a chemical before it can be offered for sale, Mr. Hitchner said. Manufacturers are putting anywhere from $50,000 to $750,000 per product into research to establish a safe level of use. This level is approved by the Food and Drug Administration before the chemical can be used.

Mr. Hitchner also stated that the majority of food crops regarded as necessary to the modern American diet, such as citrus fruits, and other fruits and vegetables, cannot be grown in the necessary mass quantities without agricultural chemicals.

He concluded by congratulating the Association of Food and Drug Officials on its 60th anniversary and pledged the continuing interest of the agricultural chemicals industry in cooperating with Food and Drug officials in the protection of public health.

•

Diamond Appoints Orlik

Robert J. Orlik, chlorinated products division, Diamond Alkali Co., Cleveland, was named recently as sales promotion representative for agricultural chemicals. He will coordinate sales activities at Diamond's home office with those of its branch sales offices. Mr. Orlik has been a member of the divisional administrative staff for over a year.

•

Velsicol Intl. Staff Changes

James A. Winter has been appointed director of sales for the recently formed Velsicol International Corp. Mr. Winter has been active in the chemical industry for the past 25 years and has been associated with Velsicol Chemical Corp., the parent company, for seven years. Mr. Winter will be located at the Velsicol International Corp. headquarters in New York City.

At the same time, it was announced that Stephen S. Easter has been appointed director of technical service. Formerly with the Food and Agricultural Organization of the United Nations, Mr. Easter dealt with control activities in insect infestations and was active in operations relative to grain storage in many U. N. member nations.

Velsicol International Corporation is responsible for foreign sales of products manufactured by Velsicol Chemical Corp., Chicago.

•

S.W. Fertilizer Conf. July 18

The Southwest Fertilizer Conference and Grade meeting is scheduled for July 18-20 at the Bucaneer Hotel, Galveston, Texas. Details of the program will be available later. Stanley Hackett, Dixie Fertilizer Co., Shreveport, La., is chairman of the program committee.

PMMI Exposition Sept. 11-14

The Packaging Machinery & Materials Exposition of 1956 will be held in Public Auditorium, Cleveland, Sept. 11-14. The Exposition will place major emphasis on technical aspects of packaging.

The Packaging Institute's 18th annual Forum will also be held in Cleveland, Sept. 10-12. "Dollars and Sense of Protective Packaging" will be the theme. The Forum will emphasize basic approaches to packaging problems with open forum discussions, seminars and technical reports.

•

Monsanto Introduces Herbicide

Monsanto Chemical Co. has introduced a new grass-specific herbicide, Randox, which it claims will control weeds and grass without harming corn or beans.

The company claims that one application of Randox as a pre-emerge spray will kill germinating crabgrass, watergrass, foxtail and other weeds and grasses without harm to the beans or corn.

Randox, receiving a limited marketing this year, will have to be cleared through state and federal agencies before it can be used for food and feed crops.

•

S. American Firm Sues V-C

Schilling-Hiller, S. A. Industriae Commercial, are further complicating the Virginia-Carolina Chemicals organizational problems with a 2.4 million dollar suit filed in New York federal court early in May.

Schilling-Hiller and V-C entered into a licensing arrangement whereby the Brazilian firm would manufacture, and process in Brazil a fungicide under the name of "Black Leaf". Schilling charges that V-C hasn't given it the advice and information, nor manufacturing instructions to produce the product. Schilling further indicates that the agreement was made in February, 1954 before Virginia Carolina turned over its insecticide business to Diamond Black Leaf Co., (which is jointly owned by V-C and Diamond Alkali.) At this writing a statement has not been filed bv V-C.

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Delmarva Meetings June 30

Dr. H. L. Dunton, head of the Agronomy Department, Virginia Agricultural Experimental Station at Blacksburg, Virginia, will be the principal speaker at the 35th annual convention of the Delmarva Peninsula Fertilizer Association at Ocean City, Maryland, Saturday, June 30, at 10:30 in the George Washington Hotel.

This convention, open to all farmers and wives, will also feature representatives from the National Plant Food Institute, who will discuss new developments and trends in fertilizer application and use. Dr. Dunton will speak on the subject, "What Every Fertilizer Salesman Should Know."

The Delmarva Peninsula Fertilizer Association, comprised of Delmarva fertilizer manufacturers, meets periodically to discuss means of helping the local farmers to earn more profit per acre. Salesman and fertilizer agents, are expected to attend the convention. In addition, agronomists, soil technicians, county agents, and fertilizer inspection control officials will be present.

Of special interest this year will be the presentation of an award to be given to the person contributing most to the development of agriculture on the Delmarva Peninsula.

•

Plant Physiologist's Survey

The American Society of Plant Physiologists is currently conducting a study on the usefulness of plant physiologists in industry. They have mailed a questionnaire to agricultural chemical companies which employ or might employ plant physiologists, directed toward gaining specific information on type of research, development or production which is or may be conducted by plant physiologists and other scientifically trained personnel, together with questions concerning training, salary, educational requirements and aids, etc.

Victor A. Greulach, chairman of the committee conducting the survey, requests that (1) anyone receiving the survey return it promptly; (2) persons connected with a firm employing plant physiologists, and not receiving a questionnaire write to him for a copy. His address is University of North Carolina, Chapel Hill, N.C.

•

Alcoa Head Buys Re-Mark Stock

Arthur Vining Davis, chairman of the Aluminum Company of America, has become active in Florida's expanding chemical industry with an initial purchase of 25,000 shares of preferred stock of Re-Mark Chemical Co., an agricultural chemical firm in Miami. The purchase marks Davis' entrance into Florida chemical industry activity.

•

DuPont British Subsidiary

The Du Pont Co. announced recently the formation of a British subsidiary company, DuPont Co. (United Kingdom) Limited. The initial project of the new company will be to provide herbicides of British manufacture for the British market. The products involved are the substituted ureas, known as "Telvar" herbicide for industrial use and "Karmex" herbicide for agriculture.

The new company also will explore the possibility of future manufacture and sale of other Du Pont chemical products in the U. K.

•

West End Chem. Lime Plant

A 340 ft. rotary kiln highlights the new lime burning and processing plant of West End Chemical Co., Westend, Calif. On stream in mid-1956, this plant will produce a high purity, high calcium quicklime and hydrate. Source of material is a limerock mountain, 4 miles long, ¾ mile wide, 800 ft. high, discovered in 1955 by West End in the Argus Range bordering historic Panamint Valley in the California desert. The limerock will be processed in crushers and classifiers at the quarry site and, at the West End plant site, in a 340 foot rotary kiln and hydrators. Large new storage and shipping facilities have been constructed to support expanded sales of West End hydrate and quicklime both within and beyond California.

Spray Bid to Roberts, Central

The eastern spray bid for control of Gypsy Moth administered by the US Department of Agriculture at Greenfield, Mass., has been awarded to Roberts Aviation of Boise, Idaho and Central Aircraft of Yakima, Wash. The bid was cut to 420,000 acres. H. L. Blaisdell in in charge of the project. The main headquarters will be in Port Jervis, New York.

The Federal Government has requested United Heckathorn, Richmond, Calif., to work on a project in Florida on Mediterranean Fruit Fly.

•

Quarantine Against Medfly

Effective May 16, the southern Florida counties of Broward and Dade will be regulated under a Mediterranean fruit fly quarantine, the U.S. Department of Agriculture announced last month. Fruits and vegetables, and other garden and orchard products of all kinds, all types of soil, and other products and articles likely to harbor this serious pest of fruits and vegetables, moving interstate from the regulated counties, in general will require certification based on treatment, inspection, or nonexposure to infestation.

•

S. Control Officials To Meet

The fourteenth annual convention of the Association of Southern Feed and Fertilizer Control Officials will feature a round table discussion on pesticides, together with reports on fertilizers, regulatory control, etc., when it is held June 28-30 at the Hotel Roanoke, Roanoke, Va.

M. A. Manzelli, Virginia-Carolina Chemical Co., Richmond, will discuss some "Recent Developments in Nematocides;" and H. L. Dunton, Virginia Polytechnic Institute, Blacksburg, will report on "Factors Affecting Efficient Fertilization." A report on "The Control Official and His Services to Agriculture" will be presented by L. B. Dietrick, VPI.

Guest speakers at the meeting will include Russell Coleman, executive vice president of the NPFI, John D. Conner, Washington attorney; Parke C. Brinkley, Va., Commissioner of Agriculture; and M. P. Etheredge, dean, Mississippi State College.

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Fulton's sewn multiwall bags can be ordered with regular valve, a creped tuck-in sleeve or a variety of inner sleeves such as the superior Ful-Flex®. In pasted multiwall bags you get a choice of valves with or without inserts and extensions. You may specify printing on any paper bag in non-skid, non-rub Ful-Grip Ink (at no extra charge) permitting higher stacking without slipping. Ful-Flex® Elastic Multiwalls—low-cost replacements for rigid containers—have three to five plies of tough crinkled paper . . . can be moisture-proofed with a special barrier ply . . . are strong, easy to handle, convenient to store. WPPL (Water Proof Paper Lined) textile bags with paper or polyethylene laminations keep out dampness, retain proper moisture inside. Or if you have other difficult packaging problems, Fulton's Special Services Division will assist in developing a package that suits you perfectly. Just call or write your nearest Fulton branch today.

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Congo Pyrethrum Extract

Growers in the Belgian Congo and Ruanda-Urundi of African pyrethrum, plan to erect an extraction plant in Africa that will reduce the flowers to basic pyrethrins.

An announcement from Goma, the Congo's "pyrethrum capital," made public in a statement by African Pyrethrum Development, Inc., indicates that the growers have signed a contract for a $500,000 processing plant which they expect to handle all of their flower production not otherwise processed locally before the end of 1957. These growers subscribed all of the capital of the Kivu Agricultural Products Processing Co.

Extraction of pyrethrins on the spot will make possible shipment of a few pounds of extract in place of 440-pound bales of flowers now consigned to American extraction plants.

The new plant is to be constructed by a Belgian company under specifications calling for "25 per cent of crude extract or a refined extract which will meet American specifications for the manufacture of aerosols."

•

Davison Expands Plant

Davison Chemical Co., Division of W. R. Grace and Co., has announced that new facilities costing $400,000 for the fertilizer processing have been installed at its Curtis Bay Works. These have added to capacity and enabled production of an improved type of granulated fertilizer.

Extensive reconstruction of one of the existing buildings at the plant was required to house the new granulation equipment. It was explained, that in process, the fertilizer is characterized by positive heat control and use of ingredients in the economical and efficient solution form. These include phosphoric acid and nitrogen or urea solutions.

A. R. Worral is manager of the Curtis Bay Works.

•

Tolerances for Pyrethrins Set

Fairfield Chemical Division, Food Machinery and Chemical Corp. announced last month that tolerances for piperonyl butoxide and pyrethrins, the active ingredients of Pyrenone grain protectants, have been established by the Food and Drug Administration under the Miller Bill.

These tolerances, to become effective July 22, 1956, will be 20 ppm for piperonyl butoxide and 3 ppm for pyrethrins. Approval has been granted for application of these materials, in either powder or liquid form, to stored wheat, corn (including popcorn), rice, rye and barley at these tolerance levels.

Shea Advances Five

Shea Chemical Corp., Jeffersonville, Ind., producers of phosphorus, recently announced five personnel advances in connection with its expansion program in Tennessee and Texas.

E. P. Madsen becomes senior vice president; J. D. Hogan becomes vice president; J. B. Sutliffe becomes vice president; G. C. Taylor was named controller, and Vincent H. Shea, Jr., was named general purchasing officer.

Hardinge CONSTANT-WEIGHT FEEDERS *for Fertilizer Blending*

Three Hardinge Constant-Weight Feeders for proportioning raw materials in a uniform blend onto a moving conveyor.

Many internationally known fertilizer manufacturers use the Hardinge Constant-Weight Feeder for their blending processes. Users of the Hardinge Constant-Weight Feeder for accurate fertilizer blending and mixing include:

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Comptoir des Phosphates Tunisiens (Tunisia)
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Anhydrous ammonia offers a rapid and economical means of raising the nitrogen level of the soil. Corn growers, for example, report that for each dollar's worth of anhydrous ammonia (properly applied), they can expect a yield of as much as five extra bushels of corn.

The Atlantic Refining Company is a prime source of supply for many companies using anhydrous ammonia. For detailed information on this and other Atlantic petrochemicals, write the Atlantic office nearest you. The Atlantic Refining Company, 260 South Broad Street, Philadelphia 1, Penna.

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In Canada: Naugatuck Chemicals Division of Dominion Rubber Company, Ltd.

In Europe: Atlantic Chemicals SAB, Antwerp, Belgium

Fangmeyer Joins Northern

Northern Chemical Industries announced last month the appointment of Donald T. Fangmeyer as general sales manager. Mr. Fangmeyer formerly held various sales positions with Olin-Mathieson Chemical Co., the latest of which was manager of the wholesale sales of their Eastern Fertilizer Division. Since 1950, he has been active in the sale of anhydrous ammonia for both direct application and fertilizer mixing. Effective June 1st, he will be at N.C.I.'s Searsport, Maine plant.

•

Clark Dealer W. Arkansas

Lift Truck & Service Co., North Little Rock, Ark., has been appointed to sell and service the industrial forklift trucks, powered hand trucks and straddle carriers manufactured by the industrial truck division of Clark Equipment Co.

The dealer will take over branch facilities set up at that address by Fred J. Vandemark Co., Clark dealer in Memphis.

W. S. Sherman is president of Lift Truck & Service Co., and M. H. Soltz, secretary and treasurer, will serve as general manager.

•

New Hudson Trade Mark

A new trade mark for its combined line of Hudson-Hammond multiwall shipping sacks has been announced by Hudson Pulp & Paper Corp.

The Hudson name dominates a circular design in which the company's nationally advertised ship and Hammond's "Betterbags" label is included. Hudson's multiwall plant locations are listed at the bottom, following the arc of the circle.

Hudson's acquisition of Hammond Bag & Paper Co. last summer has more than doubled the parent firm's production of multiwall shipping sacks.

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Betterbags
HAMMOND
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•

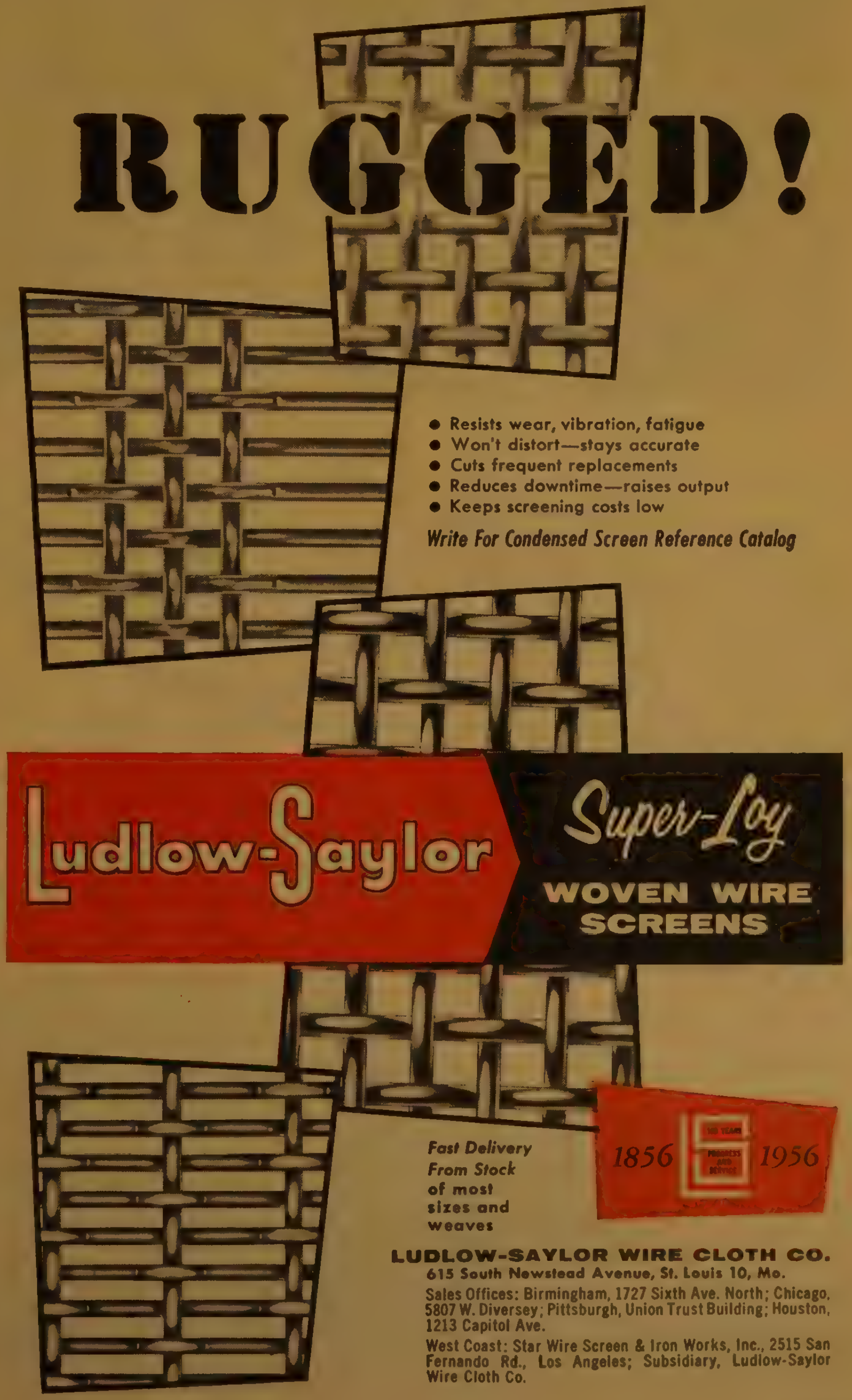
GSD Elects Fredrick

John M. Fredrick of F.E.C. Fertilizer Co., Homestead, Fla. has been selected by Gamma Sigma Delta, agricultural honor society. Each year the society selects five persons through the state for membership. Persons selected are on a basis of having rendered signal service "to the cause of agricultural development."

Minerals & Chemicals Story

In step with its occupation of new administrative offices and research center at Menlo Park, New Jersey, Minerals & Chemicals Corp. of America has published a 16-page brochure about the company.

The booklet explains origin and formation of the company and its three wholly-owned subsidiaries. Separate sections tell a "mine-to-finished-product" story of the firm's operations in kaolin, Attapulgite, limestone and bauxite.


RUGGED!

- Resists wear, vibration, fatigue
- Won't distort—stays accurate
- Cuts frequent replacements
- Reduces downtime—raises output
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Write For Condensed Screen Reference Catalog

Ludlow-Saylor

Super-Loy
WOVEN WIRE SCREENS

Fast Delivery
From Stock
of most
sizes and
weaves

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LUDLOW-SAYLOR WIRE CLOTH CO.
615 South Newstead Avenue, St. Louis 10, Mo.
Sales Offices: Birmingham, 1727 Sixth Ave. North; Chicago, 5807 W. Diversey; Pittsburgh, Union Trust Building; Houston, 1213 Capitol Ave.
West Coast: Star Wire Screen & Iron Works, Inc., 2515 San Fernando Rd., Los Angeles; Subsidiary, Ludlow-Saylor Wire Cloth Co.

SULPHUR

helps to create

headline products

Ore milling specialists have settled upon acid leaching as the most practical and economical way to extract uranium values from ore concentrates. And as with so many other ore-leaching processes, sulphuric acid appears to be the best of the solvents, considering costs and availability.

So chalk up another 'headline' end-use for this most widely used of all acids! But this very broadening demand for sulphuric emphasizes the problem facing producers of the basic element SULPHUR. Search for new commercial sources goes on without let-up all over the world. This company is playing a leading role in this search.

Texas Gulf Sulphur Co.

75 East 45th Street, New York 17, N.Y.

Sulphur Producing Units

- **Newgulf, Texas**
- **Moss Bluff, Texas**
- **Spindletop, Texas**
- **Worland, Wyoming**

Soil Scientists to Meet in Nov.

Southern soil scientists and representatives of the fertilizer industry will hold a Work Conference at the Atlanta Biltmore Hotel, Atlanta, Ga., on November 2, "to review new research findings in agriculture and to discuss problems of mutual concern to the land-grant colleges, state departments of agriculture, and the fertilizer industry." Announcement of the meeting was made by Dr. Howard T. Rogers, head of the agronomy department at Alabama Polytechnic Institute at Auburn and chairman of the Southern Regional Soil Research Committee, and Dr. Russell Coleman, executive vice president of the National Plant Food Institute.

The Southern Regional Soil Research Committee will hold its annual meeting on November 1 also at the Atlanta Biltmore Hotel. Dr. W. E. Colwell, North Carolina Agricultural Experiment Station, serves as advisor to the Regional Soil Research group. Dr. W. H. Garman, chief agronomist, National Plant Food Institute, is chairman of the joint Industry-College Planning Committee.

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Midwest Am. Chem. Paint Plant

American Chemical Paint Co. announced recently a new office and factory in St. Joseph, Mo., which will serve the territory between the Mississippi River and the Rockies and from Canada to the Gulf of Mexico.

Present plans include the production of agricultural chemicals such as weed and brush killers, plant hormones, aminotriazole, defoliants, liquid fertilizers and insecticides.

•

Grasshopper Film Available

County agents have the opportunity this year to show an interesting film on grasshopper control at farmer meetings and other events with "Exit Grasshoppers", a full-color, 10 minute, 16 mm sound movie. The movie describes grasshoppers, the damage they do and how they are controlled with modern insecticides. Recommended control practices are shown for both crop and range land.

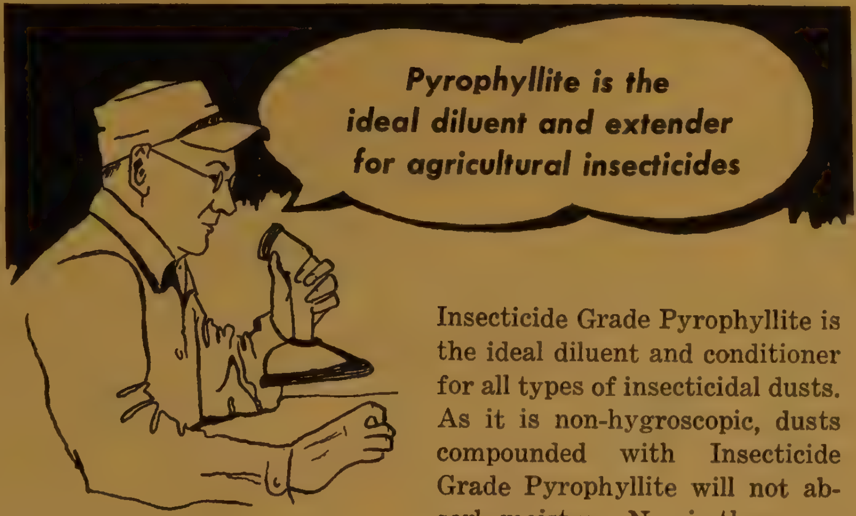
Filmed during two recent grasshopper wars, the film tells how aldrin, Shell Chemical Corp.'s insecticide, was used successfully to control critical infestations of the high-jumping pests. It shows a U. S. Department of Agriculture cooperative control project over millions of acres, and a University of Wisconsin aldrin spray demonstration in severely infested crops.

"Exit Grasshoppers" can be obtained from Shell Oil Company, Film Library, 624 South Michigan Blvd., Chicago 5.

CMRA Award to Forster

Albert E. Forster, president and chairman of the board of Hercules Powder Co., Wilmington, Delaware, received the 1956 Memorial Award of the Chemical Market Research Association for his contributions to market research in the chemical industry.

The award was presented to Mr. Forster at a dinner meeting held May 23rd in the Biltmore Hotel, New York City, at the conclusion of a two-day convention.


Pyrophyllite is the ideal diluent and extender for agricultural insecticides

Glendon's Insecticide Grade Pyrophyllite

Wt per cubic foot—30 lbs

92 to 95% will pass a 325 mesh screen

pH range of 6 to 7

Non-alkaline and chemically inert

Average particle size below 5 microns

Insecticide Grade Pyrophyllite is the ideal diluent and conditioner for all types of insecticidal dusts. As it is non-hygroscopic, dusts compounded with Insecticide Grade Pyrophyllite will not absorb moisture. Nor is there any tendency even during extended storage, for the carrier to separate from the active ingredients.

Insecticide Grade Pyrophyllite has superior adhering properties, and because it is difficult to wet, it holds well on the plant leaves even during rain. When used as a carrier for products to be dusted by airplane, it settles rapidly, minimizing drift, waste of materials, etc.

Send for Testing Samples

GLENDON

Pyrophyllite Company

P. O. Box 2414
Greensboro, N. C.

Plant & Mines, Glendon, N. C.

HIGH-K

MURIATE OF POTASH for the PLANT FOOD INDUSTRY

THIS symbol stands for high-grade coarse and uniform Muriate of Potash (60% K_2O minimum). Southwest Potash Corporation provides a dependable supply of HIGH-K* Muriate for the plant food industry.

*Trade Mark

Southwest Potash Corporation

61 BROADWAY ★ NEW YORK 6, N. Y.

Fertilizer Safety Contest

The fertilizer section of the National Safety Council is sponsoring a safety contest for the employees of the fertilizer industry, and offering $500 in prizes. The contest began April 1, and will continue through June 30th. Entries should be mailed to J. S. Kato, National Safety Council, 425 North Michigan Ave., Chicago. The contest is open to any employee of the fertilizer industry. No entry blank is required.

Applicants should send in a picture of any (1) new device, (2) improved equipment, (3) tested operation, or (4) other better way of doing a job which has improved safety in his plant. The picture should be accompanied by a short statement covering the original unsafe situation, what was done to correct it, and the results obtained.

•

CFA Student Program

The California Fertilizer Association addressed an appeal last month to the high school students of California and Arizona to consider careers in scientific agriculture or in industries serving agriculture. The Association offers its assistance in placing qualified graduates of advanced courses in chemistry, soil science, and agronomy in positions within the chemical fertilizer industry. In addition to the fertilizer industry, the pesticide, seed, farm equipment, and allied industries can provide good careers for those who are qualified. It is suggested that interested students plan now for their future courses of study to qualify them for these preferred positions.

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Min'l & Chem. W. C. Reps

Minerals & Chemicals Corp. of America, Menlo Park, N. J. has added four distributors to its West Coast technical sales and service team: E. M. Walls Co., 353 Sacramento St., San Francisco, Chemical-Additives Co., 3155 Leonis Blvd., Vernon 58, Calif.; Cordano Chemical Co., 56 Southeast Belmont St., Portland, Ore.; D. B. Smith Co., 1016 First Avenue South, Seattle.

60th Conf. of Food Officials

The firmly established partnership of government and industry working for the American consumer in the processing of fine foods, drugs, cosmetics and chemicals was a major theme of the 60th annual conference of the Food and Drug Officials of the United States, May 6-11, New Yorker Hotel, New York. Among those who addressed the several hundred conferees were Governor W. Averell Harriman, U. S. Commissioner of the Food and Drug Administration George P. Larrick, Dr. R. G. H. Siu of the U. S. Quartermaster General's Office, and A. B. Clow of the American Cyanamid Co.

●

Literature on Chelates

Several reprints of articles dealing with chelates together with Refined Products' literature on the subject are compiled in a folder by Refined Products Co., Lyndhurst, N. J. Among the reprints included in the folder is the article by Firman E. Bear, on "Iron Chelates in Agriculture" which appeared in the July, 1955 issue of *Agricultural Chemicals*. A 6-page, 4-color booklet "Perma Green Iron 135" prepared by the research department of Refined Products illustrates iron deficiency in fruits, vegetables and flowers.

●

AmPotash Safety Program

The industrial safety program in effect at the Whittier, Calif., Research Laboratories of American Potash & Chemical Corp., Los Angeles, was augmented recently to include a course in emergency fire fighting. The purpose of the course was to acquaint research employees with methods of fighting fires and correct handling of auxiliary equipment.. The fire-fighting forum was arranged by the Whittier Research Laboratory's safety committee in cooperation with the Whittier Fire Department.

●

Columbia S. Advances Haley

Appointment of E. Wayne Haley as assistant to the president of Columbia-Southern Chemical Corp., Pittsburgh, Pa. was announced last month. Columbia-Southern is a wholly-owned subsidiary of the Pittsburgh Plate Glass Co. Mr. Haley has also been elected a vice president and director of the Pittsburgh Plate Glass Export Corp.

Mr. Haley will headquarter at the New York Office, have charge of the exportation of chemicals through either Columbia-Southern or PPG Export Corp. as well as handle other special assignments.

Reasor Hill Names Mgr.

M. M. Witter has been named manager of the packaged products division of the Reasor-Hill Corporation located at Jacksonville, Ark. The company manufactures agricultural insecticides and a variety of sprays and dusts for protection of lawns and gardens against insect damage, and its products are retailed throughout the United States and in several Mexican states.

DO YOUR PLANE DUSTS HAVE GROUND ROLL?

Airplane dusts made with Barden Clay develop a "ground roll," covering the *underside* as well as the upperside of the leaf. Barden Clay has bottom-side coverage up to 70% or more of upper leaf surface deposit...and Barden's excellent adhesive qualities hold the toxicant to the leaf for double crop protection! Results prove that for dustability, coverage, retention and mortality, Barden Clay is the outstanding diluent. To quote one leading manufacturer, "Barden Clay is so superior we can't afford *not* to use it."

For ground or plane dusting, use Barden Clay, the scientifically-prepared diluent. It adds *extra power* to your product...*extra punch* to your sales. Samples on request.

J. M. HUBER CORPORATION
100 PARK AVENUE, NEW YORK 17, N. Y.

HUBER
World's Largest Producer
of Aerfloted Kaolin Clay

For Dust or Spray...
use Barden Clay—
the Low-Cost Scientific Diluent

7-Point Barden Score
✓ Improved dispersion
✓ Lower abrasion
✓ Better coverage
✓ Better retention
✓ Higher mortality
✓ Greater uniformity
✓ Maximum economy

FOR A *Superior* AGRICULTURAL LIMESTONE PRODUCT

BRADLEY HERCULES MILLS

From rough to finish . . .
in one low-cost operation

Constant progress in design and manufacture over the past 50 years has made Bradley Hercules Mills the standard pulverizer where a superior agricultural limestone product is desired. Automatic electrical feed control eliminates manual operation. Rugged, dustless construction, maximum accessibility keep maintenance costs at an absolute minimum. In sizes to meet the requirements of most any plant at moderate cost.

For complete information, write for Catalog No. 61

Bradley PULVERIZER CO.

LONDON ALLENTOWN, PENNA. BOSTON

Fertilizers---and Fertilizer Raw Materials

Phosphate Rock	**Superphosphate**
Mixed Fertilizers	**Potash**
Nitrogenous Fertilizers	**Agricultural Chemicals**

INTERNATIONAL ORE & FERTILIZER CORP.

500 Fifth Ave. New York 36, N. Y.

Velsicol Advances at Marshall

Velsicol Chemical Corp., announced the following personnel advances at the Marshall, Illinois, plant.

Wilson C. Keyes, formerly production superintendent, has been appointed to the newly created position of assistant plant manager. The new production superintendent is John Rex. Robert Tiefel takes over the post of assistant superintendent of the production area.

The Velsicol Marshall plant produces technical chlordane. The company also has a plant at Memphis, and headquarters at Chicago.

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Chemical Industry Reviewed

"Review and Forecast of the Chemical Industry" was the theme for the 16th annual meeting of the Chemical Market Research Association held May 22-23 at the Hotel Biltmore, New York.

Included among the speakers and papers presented at the May 23 technical session was "Nitrogen Chemicals," by Dr. E. D. Crittendon, director of research, Nitrogen Div., Allied Chemical & Dye Corp. Dr. Crittendon, illustrating his talk with slide charts and graphs, traced the growth of the synthetic ammonia industry from 1925 to the present. "Ammonia," he said, "is the key zone of the nitrogen industry."

As of March 1, 1955, there were 35 ammonia plants in the U. S. compared with 51 plants completed or under construction today, producing 5 million tons of ammonia per year.

Dr. Crittendon examined several new outlets for nitrogen, among them nitrogen for plastics, jet fuels and drugs for treating mental ills. "Few other industries present the challenge to market research that nitrogen does," Dr. Crittendon concluded.

John Rivoire, Market Development Div., Westvaco Mineral Products Div., Food Machinery & Chemical Corp., delivered the paper "Phosphorus Chemicals," by Walter J. Riley, manager of the Market Development Div. He presented an appraisal of the major categories of present and future uses of elemental phosphorus. Fertilizer uses were broken down into three applications, all of which are relatively new acid uses by the fertilizer industry. Mr. Rivoire said "These include direct application in irrigation water or to the soil, either as acid or in the form of liquid mixed goods, and as solid diammonium phosphate."

"In projecting these uses the area primarily west of the Mississippi was considered as the economic one for growth potential. Direct application of acid to the soil or in irrigation waters was only projected at a modest rate."

Genl Reduction Expansion

A 100% increase in production capacity has been announced by the General Reduction Co. at its Macon, Ga., special clay processing plant. Modern facilities, used in the manufacture of "Pike's Peak Clay," include special equipment and additional storage facilities.

Quality control operations were increased at the same time and new production techniques have been used to insure continuous product quality. The clay is handled automatically from the time it enters the plant, traveling entirely by conveyors

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WANT STEEL PAILS AND DRUMS
NOW
VULCAN SHIPS IMMEDIATELY

Whether you order a carton, truckload, carload or mixed combinations in the sizes shown, you can depend on Vulcan to ship promptly.

Many buyers find Vulcan's prompt delivery helps them keep container inventories at a minimum . . . no need to keep big stocks of containers on hand to meet production schedules. They order containers when needed . . . *in any quantity.* Vulcan gets them there in time!

Vulcan's tremendous warehouse stock in all styles and sizes steel pails and drums makes this possible . . . for Vulcan's sole interest is in manufacturing the finest in steel containers.

Vulcan's complete selection of all types nozzles and pouring spouts plus protective interior linings . . . wide choice of container colors . . . expert label design and lithographing facilities makes Vulcan your best source of supply.

So check Vulcan on your next container order. It could pay you in time and money saved!

These Sizes Steel Pails and Drums Available

**1-1½-2-2½-3-3½
4-5-6-6½-7-8-9
10-12 and 15
gallons**

over 40 years container experience

VULCAN CONTAINERS, INC.

Bellwood, Illinois (Chicago Suburb) Phone: Linden 4-5000
In Toronto, Canada—Vulcan Containers Limited.
Representatives in all Principal Cities

FOR POISONOUS POWDERS THAT MUST NOT SIFT—

DUOTITE BAGS

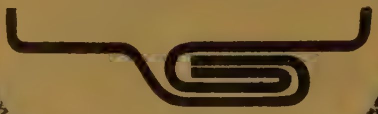
with interlocking bottoms

To make sure your product won't sift—to give your customer full value—pack your insecticide in Continental's Duotite bags! Each bag has a double-folded and heat-sealed bottom, which, combined with liners, gives absolute assurance against product loss. The top of each bag can be heat-sealed after filling, too. Add to this sift-tightness the eye appeal of crisp color-printing by Shellmar-Betner craftsmen, and you have a package that will mean bigger sales for you.

This is only one of many packages that Continental now makes for chemical products. If you'd like better flexible packaging for your product, check with us today.

SIFT-PROOF BOTTOM

Each bag is specially lined, double-folded, and heat-sealed. This means positive protection against sifting . . . full measure of quality for your customers.



CONTINENTAL CAN COMPANY

SHELLMAR-BETNER DIVISION

QUALITY PRINTERS AND CONVERTERS OF FLEXIBLE PACKAGING MATERIALS through all manufacturing processes until it is automatically packed in bags.

•

Pennsalt Prod. Improvements

Pennsylvania Salt Manufacturing Co. have announced intention to immediately replace sodium chlorate cells at the company's Portland, Ore. plant. Utilizing an improved electrolytic cell developed by Pennsalt technical and operating personnel, the new facilities are expected to go on stream early next year.

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V-C Committee Asks for Proxies

An independent stockholders committee for Virginia-Carolina Chemical Corp., seeking to put six new directors on the board, has sent shareholders a letter which has been filed with the Securities and Exchange Commission and with the New York Stock Exchange. The committee is asking for proxies.

•

USDA Names Dr. Ennis

Dr. W. B. Ennis, Jr., Weed Investigations Section, USDA, has been named project leader for weed control in horticultural and field crops at the Beltsville, Md. station. Since Feb. 1954 Dr. Ennis has served as regional coordinator for the Weed Investigations Section at State College, Miss.

•

Nopco Names Murphy

Nopco Chemical Co. has appointed D. E. Murphy as a new member of its technical sales staff. Mr. Murphy has been assigned to the Southern California sales district, and will make his headquarters in Los Angeles. He has been associated with the chemical industry for many years, in both a technical and sales capacity.

•

Nitrogen Surplus in '56

World nitrogen production for the 1955-56 period will exceed consumption by some 670,000 metric tons, according to the semi-annual report of the London brokerage firm, Aikman, Ltd.

An important factor, Aikman indicates, is that a great deal of the increased capacity is in the United States, "where exportation is impossible, owing to high overland freights, and, consequently, as consumption in these parts of the country has not reached expectations, production is at present well below capacity."

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Calspray Relocates NJ Office

The California Spray Chemical Corp., announced May 28th the relocation of their northeast Atlantic district offices from Linden, New Jersey, to 133 Kings Highway East, Haddonfield, New Jersey.

Solution to Farm Surplus?

A plan to master the nation's number one domestic problem, the farm surplus, was described last month in Cleveland by John S. Williams, senior vice president and director of Cunningham & Walsh, New York ad agency when he spoke before the National Newspaper Promotion Association. Essence of the plan is to sell this surplus both here and abroad by a large-scale use of the modern advertising and marketing

Pike's Peak

ABSORBENT CLAY

A SUPER CARRIER
AN OUTSTANDING DILUENT

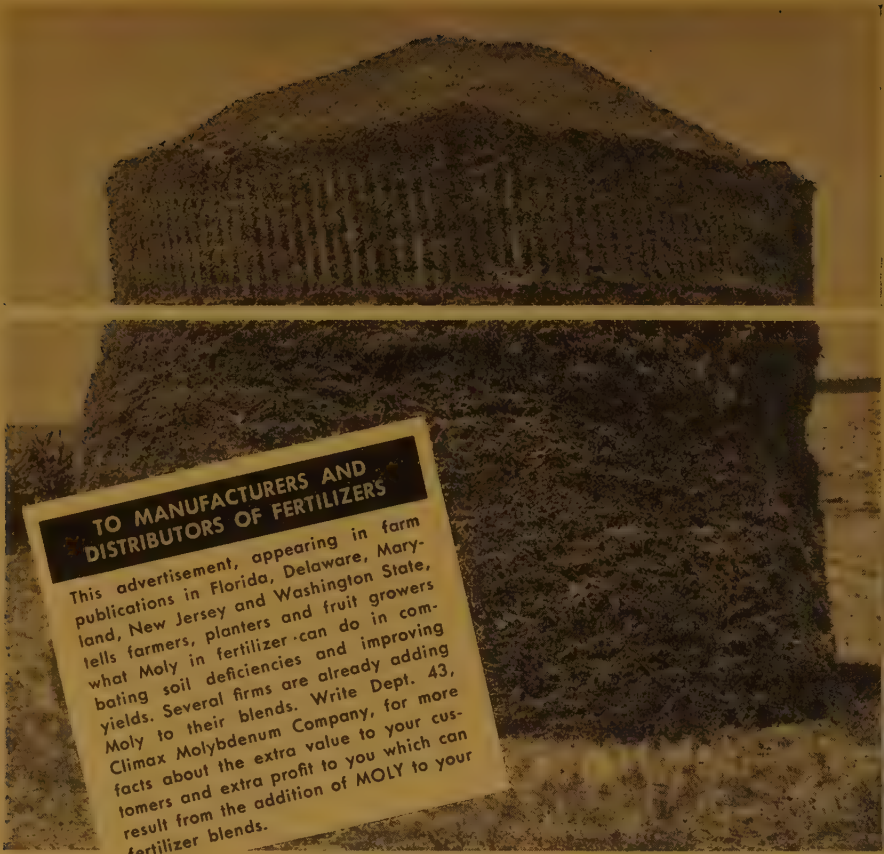
NOT only will you save on ton prices, but Pike's Peak Clay will help speed up production. Its high degree of absorbency improves grinding and impregnating all toxicants. Pike's Peak's uniformly low moisture and pH of approximately 5 assure you of complete compatibility with a *wide range* of toxicants.

The extremely fine particle sizes provides outstanding flow characteristics before and after impregnation. The standard grind is guaranteed 95% through 325 mesh with a variety of other particle sizes available to meet your specifications.

A trial in your plant will convince you. Write today for complete technical data.

General Reduction Company

1820 ROSCOE STREET
CHICAGO 13, ILLINOIS



TO MANUFACTURERS AND DISTRIBUTORS OF FERTILIZERS

This advertisement, appearing in farm publications in Florida, Delaware, Maryland, New Jersey and Washington State, tells farmers, planters and fruit growers what Moly in fertilizer can do in combating soil deficiencies and improving yields. Several firms are already adding Moly to their blends. Write Dept. 43, Climax Molybdenum Company, for more facts about the extra value to your customers and extra profit to you which can result from the addition of MOLY to your fertilizer blends.

In experimental farm studies conducted in Washington State, the yield of alfalfa was increased nearly 40% by adding Moly to molybdenum-deficient soil. The fodder below the white line in the stack at the left indicates yield on moly-deficient soil. Volume above the line indicates increase produced by addition of Moly to soil. Photos courtesy of John Deere, Moline, Illinois.

How alfalfa yield has been stepped up nearly 40% by adding MOLYBDENUM to some acid Washington soils

Application of Sodium Molybdate to Moly-deficient soil, tests show, will result in sizeable yield increases

Scientific tests conducted by Dr. H. M. Reisenauer in Spokane County, Washington, have resulted in greatly increased yields of alfalfa. Investigations that began in 1952 have shown that poor forage yields were caused by Moly deficiency. Correction was made by adding one pound of sodium molybdate per acre. The applications were made in water solution, using a weed spraying outfit.

Other marked advantages result from the use of Moly

When alfalfa is grown in a Moly-deficient soil the plants tend to be stunted and pale green in color. Spots develop between the leaf veins, often spreading to affect the entire leaf. Such leaves finally die and fall off. When other conditions are favorable, these deficiency symptoms are corrected by the addition of available Moly to the soil, resulting in greater yields and more vigorous growth.

Tests here and abroad show that all crops need Moly

Thorough tests, made over the last 15 years, both in this country and in many foreign areas, have shown conclusively that all crops need Moly in a form which can be assimilated readily by the plant. If available Moly is not present in the soil in sufficient quantities, then it should be added either alone or combined with fertilizers.

Now is the time to find out whether your own soil is deficient in Moly

Specific experiments with dozens of different crops, ranging from citrus to sugar beets, proved that Moly deficiency exists in soils in many areas in the United States. If your own soil lacks available Moly you may be getting much lower yields than you should. Get in touch with your County Agent. He will be glad to help you set up test plots. Write for our bulletin: "Testing for Molybdenum Deficiency." Address Dept. 43, Climax Molybdenum Company, 500 Fifth Avenue, New York 36, N. Y.

MOLY CAN BE ADDED TO ANY FERTILIZER BLEND

When ordering fertilizer you can always specify that molybdenum be included as an additive.

CLIMAX MOLYBDENUM

techniques that have made the United States the world's greatest merchandiser.

Williams said that the problem of selling farm commodities held by the government is essentially the same as selling an inventory excess for a business organization. The only difference would be one of degree, he pointed out. Farm surplus, piling up at a rate of over nine billion dollars annually, would require market analysis, advertising, and merchandising promotion on a tremendous scale.

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Aviation Conf. Proceedings

Ohio Aviation Board, Columbus, announced recently the release of the proceedings of the fifth annual Ohio-Indiana Agricultural Aviation Conference. Copies may be secured for $2.50 from the Ohio State University Agricultural Aviation Conference Fund, 501 Wyandotte Bldg., Columbus, O.

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Sulfur Prod. in Canada

A contract for the construction of a sulfur manufacturing plant and the sale of northwestern Canada's large new sulfur production has been signed between Jefferson Lake Sulphur Co., New Orleans and Pacific Petroleums, Ltd., Calgary, Alberta, Canada.

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APMA Supports Health Institute

The American Pharmaceutical Manufacturers' Association has agreed to underwrite $50,000 for three years in support of the Health News Institute, it was announced at the 49th annual meeting of the Association held recently in Boca Raton, Fla. The APMA joins the American Drug Manufacturers' Association in support of the Institute which was created to develop and operate a public relations program for the "health team" which comprises manufacturers, wholesalers, retailers, medical practitioners and hospitals.

Members of the executive committee of the ADMA had originally personally underwritten $100,000 for three years towards the Institute but now will have to underwrite only $50,000. The personal pledge resulted before the membership of ADMA had adopted the plan, but was confirmed at the annual meeting.

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Stauffer Names Kincannon

Wayne Kincannon has been named manager of the North Little Rock, Ark. plant of Stauffer Chemical Co. He has been associated with the company's Lubbock, Tex. branch, and prior to that time was an agricultural chemicals salesman in Texas and New Mexico.

Thunderbird Arizona Plant

A new fifteen million dollar fertilizer plant will be constructed by Thunderbird Chemicals, Inc., at Kyrene, Arizona. The project has been under consideration for the past eighteen months and the company has just exercised its option on an 80 acre site for which a reported $60,000 was paid. The new plant is expected to be in operation by the end of the year. It will employ from 30 to 50 people with an annual payroll which is estimated at upwards of $150,000.

To retain its original high quality, your product must be *packaged to protect its quality!*

Every Vulcan Pail and Drum is *precision made of quality steel to protect your product* against shipping hazards. Every Vulcan Pail and Drum is *individually inspected and tested*—Vulcan's Hi-bake Lining is *guaranteed to protect your product* from physical or chemical change due to contact with its container.

Vulcan containers are available in all styles, and sizes 1 to 20 gallons. Open Head Lug-covers and Closed-Head. SERVICE-PROVEN FOR HARD-TO-HOLD CHEMICALS!

Vulcan will reproduce your present trade mark or design a new one for you. Lithographed in non-mar, permanent-finish, full-colors, *your name—your trade mark—your slogan can be your best salesman!*

OVERNIGHT SERVICE. Sales offices and warehouses in principal cities. Write or wire for detailed information and prices.

VULCAN is LARGE ENOUGH to supply your Drum and Pail needs—yet SMALL ENOUGH *to give personalized service to all Vulcan Customers.*

AN INDEPENDENT SOUTHERN COMPANY
SERVING SOUTHERN INDUSTRY

VULCAN

STEEL CONTAINER COMPANY
MAIN OFFICE AND FACTORY
3315 N. 35 Ave., Birmingham, Ala., P. O. Box 786

Equipment AND BULLETINS

Intl Ore Booklet

International Ore & Fertilizer Corp., New York, agricultural chemical importers-exporters, recently issued a 4-page booklet describing their international activities. The firm's affiliates are located in Tokyo, Bombay, Pakistan and Korea. International Ore in addition to its large fertilizer volume, deals extensively also in insecticides, fungicides and herbicides.

"Packer-ette" Bag Packing Unit

The Bemis "Packer-Ette", a new automatic bag packer designed to bring speed and accuracy to medium sized packing operations, has been introduced by Bemis Bro. Bag Company's Packaging Service.

Small and medium size production lines, processing feed, fertilizer, dry chemicals and similar products, often face expansions that place a strain on their original bag packing capacity, and yet do not justify costly permanent or heavy duty installations. The "Packer-Ette" according to Bemis fills the gap between the slow, equipment frequently found in small bag packing operations, and the somewhat expensive equipment necessary to larger operations.

Portable Ammonia Converter

A new portable ammonia converter was put into operation in April at the Aylward Fertilizer Co. in Illinois. The converter was designed and manufactured by the J. C. Carlile Corp., Denver. The converter maintains the high conversion and cooling efficiencies. It is mounted on a trailer and is capable of speeds up to 45 MPH. Converter arrival at a station is timed to coincide with that of a railroad car of anhydrous ammonia. Conversion is done directly from the car and no provision is made for anhydrous ammonia storage. High capacity of the unit permits conversion of a tank car of ammonia in four to seven hours.

Horticultural Booklet Issued

The Illinois State Horticultural Society published recently the transactions of the Society and the Illinois Fruit Council for the year 1955. Included in the booklet are the proceedings of the 100th annual convention held in Springfield last November and also proceedings of the Southern and Central District Societies for 1955.

New Pressure Relief Valve

Spraying Systems Co., Bellwood, Ill., announces their new 6815 pressure relief valve for use on farm spraying equipment of all types. Because of the large internal valve area, full flow from supply lines up to 3/4" at normal pressures can be handled. Inner rib construction of the valve body allows full flow of liquid around the shut-off piston to take place, preventing the "salting out" of such chemicals as fertilizer solutions. As a result, it is advised that plugging and clogging of the valve is prevented. The piston assembly is mounted within the valve chamber; no gaskets are used as a part of the piston assembly itself, that might swell in the presence of chemicals and retard piston action.

Polyethylene Trench Cover

Shellmar-Betner Division, Continental Can Co., announced recently an all-weather polyethylene film to cover self-feeding horizontal or trench silos. The film cover is being manufactured in widths up to 84 inches.

Offer Granular Pyrax

The R. T. Vanderbilt Co., Inc., New York announces the availability of their "Pyrax Pyrophyllite" in a new, granular form. Following extensive pilot studies and field sampling, commercial-scale granular processing equipment was recently installed in the Vanderbilt plant in Robbins, N. C. Initial production will include 8/20 mesh, 10/30 mesh and 30/60 mesh sizes; packaging will be in 50 lb. multi-wall paper bags. Loading and packaging facilities will permit mixed carload shipments of granular Pyrax and Pyrax ABB.

Pyrax granules are expected to find wide application in many unrelated fields, such as roofing, nonslip coatings, percolation and filtration beds, etc. Development of the new product, however, was largely stimulated by the rapidly expanding use of granular agricultural insecticide and fungicide preparations. As a base for these preparations, the manufacturer reports Pyrax offers distinct advantages. It has low absorption, is inert, and has neutral pH.

St. Regis Bag Manuals

Results of research into all phases of multiwall packaging are available for reference through a series of manuals issued by St. Regis Paper Co., New York. Written by multiwall packaging technical specialists — the men behind "The Man From St. Regis" — the manuals are designed to aid in cutting costs by solving packaging problems. Handbooks issued thus far include a palletizing manual, a multiwall bag papers manual, and a printing manual.

In addition to providing money-saving ideas, the manuals are an integral part of the 1956 advertising and sales promotion campaign of St. Regis. Typical advertisements appearing in trade publications are: "New developments created for you by the men behind The Man From St. Regis," and "What's coming in 1956 to help you cut packaging costs."

The palletizing manual represents the best and most current thinking on how multiwall paper bags are handled as pallet and unit loads. It incorporates publications and material made available by pallet manufacturing associations, fork lift manufacturers, and others in the palletizing field. The manual is designed to aid in cutting bag handling costs and to insure that filled multiwalls arrive at the final destination in the best possible condition.

To assist in the identification and proper application of the various papers available for use in multiwall bag construction, St. Regis issued the multiwall bag papers manual. The book includes a brief history of paper making, together with the methods used in testing, manufacturing, and conditioning the various papers used in St. Regis multiwalls.

•

DuPont Liquid Ceresan

E. I. du Pont de Nemours & Co., Wilmington, Del. offers a liquid form of its seed disinfectant "Ceresan." The new formulation includes the fumigating and residual action of the dry mercury compounds and in addition offers the convenience and the safety factor of a dye which colors the treated seed.

•

Booklet on Potato Diseases

The revision of bulletin 469, "Maine Potato Diseases, Insects and Injuries," has just been issued by the Maine Agricultural Experiment Station.

The authors, Dr. Donald Folsom, head of the department of plant pathology, Dr. Geddes W. Simpson, head of the entomology department and Reiner Bonde, plant pathologist of the Experiment Station have written the publication in popular handbook style. The booklet is divided into such sub-divisions as definitions of terms, standard control measures, diseases caused by fungi, bacteria and blight, insects, and injuries caused by small animals, weather and soil conditions and harvesting and handling conditions.

The publication cites 20 references and sources of specialized information on potatoes and gives four identification tables for classifying the effects of diseases, insects and injuries on the stems and branches of potato plants, on the leaves, on the tubers, and on the seed pieces and sprouts.

Copies of bulletin 469 may be had by writing the Maine Agricultural Experiment Station, Holmes Hall, University of Maine, Orono, Maine.

•

Atlas Introduces Roller Chain

Atlas Chain & Manufacturing Co., West Pittston, Pa., has introduced a new electrolized, non-corrosive roller chain developed for the chemical, food and bottling industries. Recent tests indicate the chain has the same tensile strength as alloy steel chain, the company said.

AAI Bulletin on Ammonia

The Agricultural Ammonia Institute reported recently that root zone applications of anhydrous ammonia can help insure a farmer's corn crop against drought.

"Producing Quality Corn," is a new bulletin released by the Institute pointing out the advantages of using agricultural ammonia. Copies available from the Institute at the Claridge Hotel, Memphis, Tenn.

•

Bulletin on Vermiculite

Vermiculite as a carrier for agricultural chemicals is described by the Vermiculite Institute in a four-page folder with a special five-page insert for formulators. Data include a complete summary of the chemical and physical properties of vermiculite, absorption capacity for toxicants, and a table of granular formulations. "Vermiculite in Agriculture" is available from Vermiculite Institute, 208 South LaSalle St., Chicago 4.

FRY BAG CLOSING MACHINE

Makes Sift-Proof Seals in Heavy Weight Paper Bags

Fry Model CSG automatically makes a double folded sift-proof heat seal in the top of any heavy weight paper bag. The first fold is securely heat sealed; the second is glued for extra safety.

Bags handled include polyethylene and pliofilm lined, polyethylene coated and those with thermoplastic top sealing bands. Simple adjustments for bags of various heights. This model also handles bags which are not heatsealable by gluing the folds.

Machine above is perfect for granular or fine products such as insecticides, chemicals, powdered paints, fertilizers, dog foods, etc.

Other models available . . . when writing, please submit a sample of your bag and your product.

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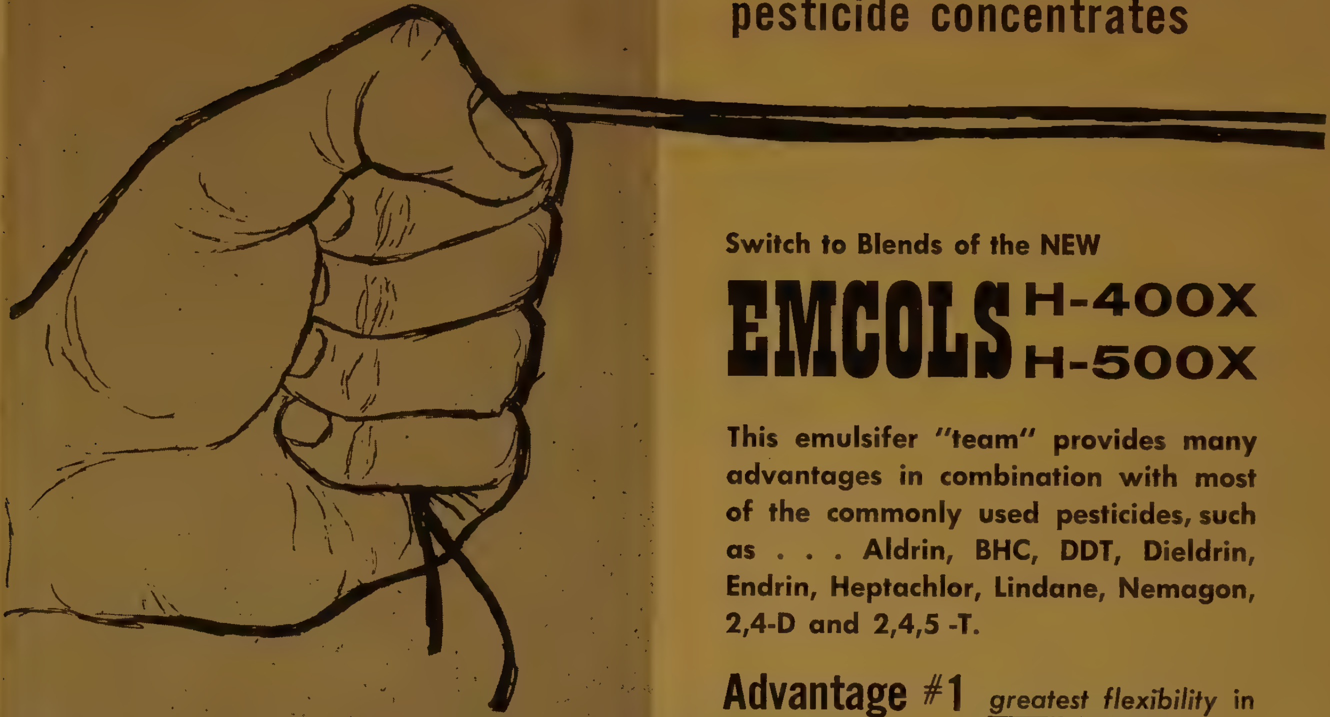
control . . . your emulsifiable pesticide concentrates



Switch to Blends of the NEW

EMCOLS H-400X H-500X

This emulsifer "team" provides many advantages in combination with most of the commonly used pesticides, such as . . . Aldrin, BHC, DDT, Dieldrin, Endrin, Heptachlor, Lindane, Nemagon, 2,4-D and 2,4,5 -T.

Advantage #1 *greatest flexibility* in performance with optimum ageability.

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We will be happy to recommend the proper emulsifier blends for your specific toxicant, solvent and formula requirements. Contact your local Emulsol representative, or us directly, for prompt technical service. Technical Bulletin on request.

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NEWS *Brevities*

ROD TAFT was transferred from the Los Angeles offices of American Potash & Chemical Corp. to the company's newly-opened office at San Francisco.

AC

PAUL STAUB has been named Pacific Northwest district sales manager for American Potash & Chemical Corp. He will operate out of Portland, Oregon, and will cover Oregon, Washington, Idaho, Montana, Wyoming and British Columbia.

AC

FRANK H. SELLARS has been advanced to the position of supervisor of general chemicals sales for the Dow Chemical Co.'s Atlanta office. Mr. Sellars will have charge of chemicals sales in a territory comprising Georgia, South Carolina, North Carolina, Alabama and Florida.

AC

BACTEX FERTILIZER CO., San Antonio, Tex., has been granted charter of incorporation listing capital stock of 7,500 shares. Incorporators: William Alter, Sylvan R. Alter and Leon A. Tobias.

AC

ST. REGIS PAPER CO. announces the appointment of Clyde C. Stinebiser as branch manager at the company's new multiwall bag plant at Kansas City, Missouri. Mr. Stinebiser previously was a superintendent at the Pensacola, Florida multiwall bag plant of St. Regis. St. Regis will move into the plant about June 1, 1956.

AC

ESCAMBIA BAY CHEMICAL CORP. recently elected Mr. R. U. Haslanger, vice president and general manager to the board of directors.

AC

MICHIGAN CHEMICAL CORP. announced earnings of $52,363 for the first quarter of 1956 as compared to $33,250 for the similar period of 1955, a gain of 57%.

AC

JAMES B. ALLEN has been appointed Supervisor-Process Improvement for Pittsburgh Coke & Chemical Co.'s Chemical Division. Previously, Mr. Allen had been associated with Koppers Co. and Tennessee Eastman Corp.

AC

THOMAS F. DOHERTY, manager of the Newark plant of Commercial Solvents Corp., died April 12th after a long illness.

FOOD MACHINERY and Chemical Corporation's Chemical Divisions, recently appointed William D. Morrison to the new post of manager, foreign chemical development.

AC

ECONO-GAS Division of Blish, Mide and Silliman Hardware Co., Atchison, Kansas, is expanding its sales program to include irrigation equipment and farm chemicals.

AC

PICKETING AT THE Bonneville Ltd., potash firm at Wendover, Utah, ended early in April.

AC

CROWN ZELLERBACH CORP., San Francisco, recently started up a pilot plant at Camas, Washington designed to produce dimethyl sulfide, which can be used as a carrier in agricultural and rubber chemicals.

AC

THE 26TH EXPOSITION of Chemical Industries will be held at the new Coliseum in New York, December 2 to 6, 1957.

SER-X

The Test Proven
Insecticide Diluent

SUMMIT
FOR
TOP QUALITY

Formulators Report
Excellent Results

...Excellent drift Control Properties
...Better Flowability
...Neutral pH
...Desirable Suspension Properties
...Controlled Bag Weights
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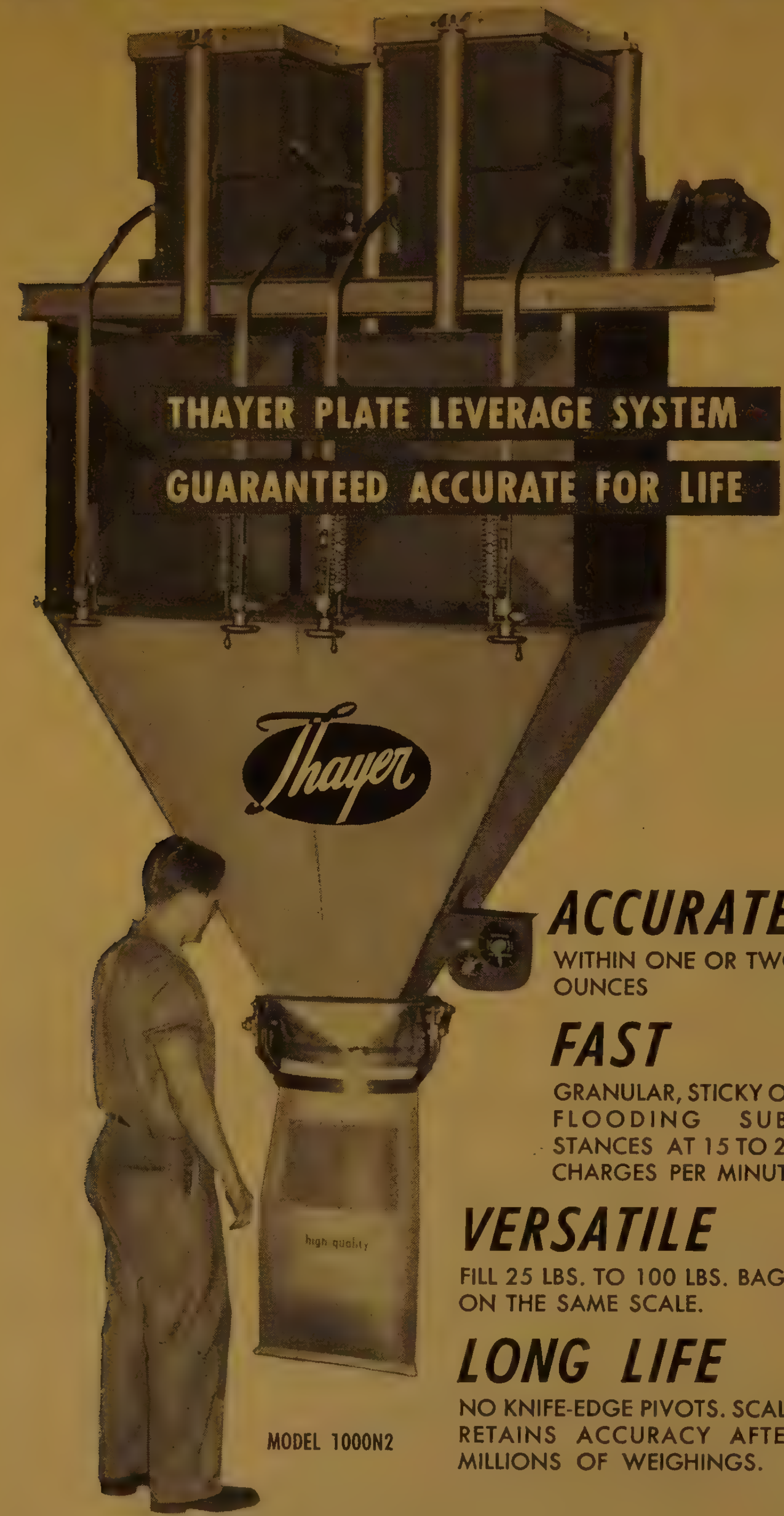
BASHORE BUILDING CARLISLE, PENNSYLVANIA

NEW BAGGING SCALE



ACCURATE
WITHIN ONE OR TWO OUNCES

FAST
GRANULAR, STICKY OR FLOODING SUBSTANCES AT 15 TO 20 CHARGES PER MINUTE

VERSATILE
FILL 25 LBS. TO 100 LBS. BAGS ON THE SAME SCALE.

LONG LIFE
NO KNIFE-EDGE PIVOTS. SCALE RETAINS ACCURACY AFTER MILLIONS OF WEIGHINGS.

MODEL 1000N2

The expanding *petro-chemical industry* uses more Thayers than any other scale. Thayer Scales are handling polyethylene, polychloride, carbon black, resins, light and dense soda ash. For engineering recommendations please write THAYER SCALE AND ENGINEERING CORPORATION, ROCKLAND, MASS.

Thayer **AUTOWEIGHTION**

BATCHING · FILLING · CHECKWEIGHING · AUTOMATICALLY

INTERNATIONAL MINERALS & Chemical Corp.'s net earnings after taxes for the third quarter of its current fiscal year, the three months ended March 31, 1956, were $2,575,390, an increase of 8 per cent over the third quarter of the previous fiscal year.

AC

DOW CHEMICAL CO.'s St. Louis sales office has occupied new quarters in a recently completed office building in suburban Clayton. The new office is located at 10 South Brentwood Boulevard, St. Louis 5.

AC

HUDSON CHEMICAL CO. has purchased a one-story building in St. Louis for expansion of its power spray and agricultural chemical divisions.

AC

PETROQUIMICA, S. A., a new firm, announced plans recently for building two fertilizer plants in Mexico. The first, currently under construction in Guaymas, will produce anhydrous ammonia.

AC

J. W. BRITTON, Dow Chemical Co., has been named manager of the agricultural chemicals division, it was announced recently. Mr. Britton had been a departmental production manager.

AC

BEAUFORT MINING & DEVELOPMENT CO., Beaufort, S. C., has been granted a ten-year lease over river bottoms and sub-tidelands along the coast of Beaufort County. The lease was granted by the state budget and control board in view of the possibility of restoring the phosphate rock industry to South Carolina.

AC

INTERNATIONAL MINERALS & CHEMICAL CORP. has leased the 27th floor of a building under construction at 485 Lexington Ave., New York. The firm has been located at 61 Broadway.

AC

TENNESSEE EXTENSION SERVICE reported recently the results of a four year study designed to show the effects of proper fertilization in getting and maintaining a stand of alfalfa.

A Franco-German group, Uda, Badische Anilinwerke and Schneider Kuhlmann companies, will build a nitric fertilizer factory at Aswan, Egypt, using power generated from the Aswan Dam.

AC

Bartels & Shores Chemical Co., Kansas City, has opened a Wichita branch for the distribution of agricultural and industrial chemicals.

AC

Wyandotte Chemicals Corp. filed a statement recently with the Securities and Exchange Commission covering its first public offering of stock, 100,000 shares of common. The issue was expected to be marketed late last month.

AC

Midstate Industrial Trucks, Inc., Massillon, Ohio, has been appointed to sell and service fork trucks and allied products of the Clark Equipment Co.

AC

Norsk Hydro, Norwegian industrial firm, is currently undergoing an expansion program which will continue for a six year period at an estimated cost of $74,200,000. The firm produces mainly chemicals, such as nitrogeneous fertilizers.

AC

George A. Dean, for 30 years head of the Kansas State College department of entomology, died April 23, at a Manhattan rest home. He was 83 years of age and had been in ill health for several years.

AC

The Anglo-Lautaro Nitrate Corp., producers of Chilean Nitrate, have announced plans to step up expansion of facilities in Chile following approval of an agreement between the government and the nitrate industry. The agreement passed by the Chilean congress increases to 40 per cent from 25 per cent the government's participation in industry profits.

AC

Stauffer Chemical Co. sales and earnings for the first three months of this year were the highest for any first quarter in the company's 71 year history according to a report being mailed to stockholders. Net sales for the three months ended March 31, 1956 were $36,513,000, an increase of 15.4% over sales of $31,638,000 during the corresponding period of 1955.

AC

Technical Development Division, Uganda, S.A., has discovered it can obtain potassium-chloride from Katwe salt, found in the salt lake at Katwe, Uganda. The chemical can be used as a straight fertilizer or as a basis for other fertilizers.

AC

Bemis Bro. Bag Co. has announced the transfer of D. E. Prim to their Detroit district sales office. Mr. Prim will service Bemis accounts in the eastern Michigan and northwestern Ohio areas.

AC

Food Machinery and Chemical Corporation's Chemical Divisions appointed Arthur S. Weygandt as manager of FMC Chemicals central development department, with headquarters in New York.

AC

Emergency Procurement Service of General Services Administration opened bids May 31 and June 4 for the purchase of fertilizer materials for shipment to India and Thailand under the mutual aid program.

AC

Prentiss Drug & Chemical Co., New York, announce that W. J. Fowler of the Whitaker Oil Company, has been named sales representative for Prentox household and industrial insecticide concentrates, including Rax Powder (0.5% Warfarin), in the tri-state area of Georgia, Alabama and Florida.

AC

E. T. Edwards, director of public relations & publicity at the University of New England, Armidale, N.S.W. has been elected president of the Australian Institute of Agricultural Science for 1956.

IT'S HERE -

IT'S PROVEN

ITS Y-M CO'S. 500 LB. PORTABLE CUT-BACK DUST BLENDING SYSTEM

Capacity — Four to six 500 lb. batches per hour

Space Requirement —
6'6" x 10'6" x 15' O. A. Ht.

DELIVERED TO YOU—READY TO OPERATE

System Includes — Dust hood at loading station; Sifter; Pre-Mixer at floor level; Pneumatic Conveyor-Blender; After-Mixer with dust collector; Dust hood at packaging station, etc; All motors wired to panel box with push button controls.

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YOUNG MACHINERY CO.
MUNCY, PA. TODAY!

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Ga. Fertilizer Dealers Conf.

The 1956 Extension Fertilizer Dealer-Manufacturer Conferences in Georgia will be held July 10-13th. The meetings will be held in four regional areas: Northwest District, on July 10th at the Ga. Experiment Station in Griffin; Northeast District, July 11th at the Experiment Station in Athens; the Southeast and Southwest Districts on July 13th at the Coastal Plain Experiment Station in Tifton, Ga.

J. R. Johnson will preside at each of the opening sessions, following which the groups will tour the various experiment stations. In the course of the afternoon, J. R. Johnson, R. Wehunt, and J. Bergeaux, extention agronomists will discuss progress in fertilizer recommendations; G. King will report on the fertilizer potential created by research; and Paul Jolley will report on a new system of grade reporting in Georgia. The meetings will conclude with a question and answer forum directed by L. W. Eberhardt, Jr.

The annual meetings are sponsored by the Agricultural Extension Service, Univ. of Georgia, College of Agriculture; and the Georgia Plant Food Educational Society.

•

Best Fertilizers To Build

A million dollar expansion program is contemplated for the Best Fertilizers Co. plant at Lathrop, Calif. Lowell W. Berry, president, says construction has started on a new addition which will produce 200 tons of sulfuric acid per day.

•

Joins Mich. Chem. Staff

John A. Holderried has just joined the research staff of Michigan Chemical Corp., St. Louis, Mich., as part of the company's current development program. He was recently with Liberty Powder Defense Corp., Baraboo, Wisc., as a chemist. He holds a master's degree from Oklahoma A & M.

•

Joins Spencer Market Staff

Robert W. Dardcopf has just joined Spencer Chemical Co. as a junior market analyst in their Agricultural Chemicals Market Research Department. He takes the place of Robert Farrow who recently was named Ohio agricultural sales representative for Spencer.

•

AMERICAN POTASH & CHEMICAL CORP. has announced the establishment of offices at Washington, D. C., for the purpose of improved liaison between governmental agencies and the company's department of defense programs. Herbert W. Yeagley has joined American Potash to head the Washington office.

EDITORIAL

(From Page 33)

in the past year or two.

Added to all the above, is the prospect of continuing heavy exports of some of our basic pesticidal chemicals like DDT to continue malaria eradication programs in various foreign areas. If June and July come up warm and moist, we may wish we had kept some of our surplus stocks at home.

Handbook of

INSECTICIDE DUST DILUENTS AND CARRIERS

250 Pages

$4.75 in USA $5.25 Elsewhere

THE original publication "Properties and Commercial Sources of Insecticide Dust Diluents and Carriers" prepared by T. C. Watkins and L. B. Norton of Cornell University has been brought up to date and completely revised by Drs. Weidhaas and Brann. The new edition contains commercial information as well as data obtained in research conducted at Cornell University, Ithaca, New York.

The book is bound in a flexible leatheroid cover, for handy, practical use.

TABLE OF CONTENTS

- Botanicals
- Sulfur
- Tripolite
- Diatomite
- Calcium Limes
- Magnesium Limes
- Calcites
- Dolomites
- Gypsum
- Mica
- Vermiculite
- Talc
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Enclosed is our check for $4.75 (Canada and Foreign, $5.25) covering a copy of the HANDBOOK OF INSECTICIDE DUST DILUENTS AND CARRIERS. It is understood that we may return the book within ten days for a full refund.

Name ....

Company ....

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C-VPFA MEETING

(From Page 42)

The complete costs of overhead, selling, training expenses, production, etc., in determining product costs were detailed by Wayne T. Showalter, public accountant, in an address before the C-VPFA members. He cautioned his audience to be aware of all factors involved in making up cost, and remarked that too often businesses fail because of too great costs in unknown concentrated areas.★★

F-P MIXTURES

(From Page 51)

Material handling is simplified by stacking light bags instead of heavy drums. The drum disposal problem is non-existent.

Loss of toxicant as mist or loss of fertilizer as dust, due to liquid jet blast, is eliminated when sticker concentrates are used.

No objectionable odors due to liquid insecticides or solvents are found in the process.

Sticker concentrate is less expensive per unit of active ingredient than oil concentrates because of the use of less costly diluents and bags instead of drums.

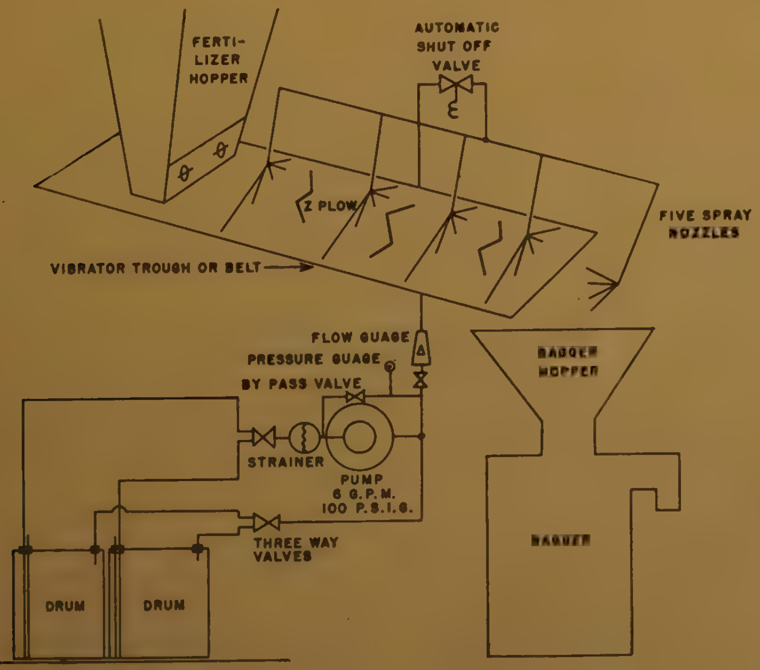
The problem of cold stability is eliminated with sticker concentrate.

Bulk Loading

IN bulk loading operations where a guarantee of uniformity of insecticide distribution is badly needed, the application of heptachlor sticker concentrate results in effective and reproducible distribution of the insecticide. This concentrate can be added in a bulk loading operation in any way granular or dust concentrates are now added. The installation of a star feeder (Figure 1) provides assurance that the right amount of insecticide will invariably be added, and also, eliminates mistakes attributable to the human element at this highly repetitive task.

A star feeder is equipped with an activating time release lever, which is tripped by the downward motion of the pay loader scoop and timed to feed the sticker concentrate into the conveyor during the time the fertilizer is emptying from the scoop. At the end of the unloading period, the time release disengages the activating lever to stop the flow of sticker concentrate. The star feeder, equipped with a deep rotor, is set to deliver the correct amount of sticker concentrate over the discharge period by adjustment of the variable-speed drive.

Figure 3



Bag Loading

IN a bag loading operation a star feeder with an extended hopper, hopper agitator, adapter chute, medium rotor and a variable speed drive (Figure 2) is installed to add the sticker concentrate to a belt or vibrator trough. The star feeder should be installed so the sticker concentrate can be added as close to the belt or trough as possible, either in front or in back of the location where the fertilizer is fed onto the conveyor. As the fertilizer and insecticide move down the conveyor, they are further mixed by flowing over "Z"-shaped plows.

This sticker concentrate can be applied to fertilizer in a bag loading operation at any percentage concentration in the range ¼ to 2%, at any rate at which the fertilizer customarily flows (800-1600 lbs. per minute) and held to very close tolerances during this application. The power source of the star feeder is energized by the conveyor operating solenoid so that the sticker concentrate flows only when the fertilizer flows.

Distribution of Sticker

THE sticker concentrate is ideal for fertilizers because it flows readily through the fertilizers and coheres tenaciously. It also has a low saturation maximum of about 3% insecticide, which prevents high percentages of insecticide adhering to certain portions of the fertilizer. Studies of stratification, as found in some granular insecticides, show that better distribution can be obtained when a greater number of particles of insecticide per pound are used. The sticker concentrate has many more individual particles than are found with the same weight of granular insecticide. It is estimated that there are at least sixty-four particles of sticker concentrate for every particle of granular insecticide.

Dry Concentrate-Granular

By the new method of heptachlor impregnation, very dependable granular insecticide formulations containing from 5 to 40% of actual heptachlor are being made. The stratifi-

"USE WITH CONFIDENCE"

A NATURAL QUALITY PRODUCT

TAKO

Airfloated: Bagged or Bulk

Guaranteed less 1% free moisture

QUALITY & SERVICE SINCE 1939

A HIGH GRADE COLLOIDAL KAOLINITIC KAOLIN

Used in large tonnage for years most successfully and economically as a prilling agent and conditioner of fertilizers. Excellent adhesive — absorption — colloidal properties. Excels in formulations of insecticides.

NON-ABRASIVE NON-HYGROSCOPIC NON-CAKING FREE-FLOWING

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THE THOMAS ALABAMA KAOLIN COMPANY,
2412 KEN OAK ROAD, BALTIMORE 9, MARYLAND
IT WILL PAY YOU TO INVESTIGATE "TAKO" FOR YOUR REQUIREMENTS

Uniform Quality
Prompt Shipments

cation of certain granular insecticide materials in fertilizers can probably be minimized by selecting the proper concentration of granular material closer to the bulk density of the fertilizer. The granular insecticides, made by the new method of impregnation eliminate any phytotoxicity that might arise from solvents. Solvents are not used in the new method of granular impregnation.

Field tests carried out in 1955 showed some very interesting results with the use of insecticides on granular vermiculite which has resulted in a renewed interest in this medium. A new insecticide grade of vermiculite 16-60 mesh has been introduced and 40% insecticide has been prepared on these granules.

Liquid Concentrates

LIQUID insecticide concentrates have been added to fertilizers by impregnation in blenders and by impregnation on vibrator troughs and belts. (Figure 3) The limiting quantities of insecticides applied to fertilizer in oil solutions are usually around ¾ of one percent and the range of concentrations of insecticide that can be applied without stopping to change nozzles is limited. It is possible, however, with several manifolds containing sets of precalibrated nozzles to swing a new manifold into position when a change in rate of insecticide application is needed.

The use of a dependable flow meter will make it possible to quickly adjust and hold the correct rate of insecticide application. The two drum and three-way valve installation makes it possible to replace empty drums of insecticide oil concentrate without stopping production, and provides for quick change of rate of application or change of insecticide.

Addition to Liquid Fertilizers

A new liquid suspendable 50% heptachlor powder has been developed by Velsicol for addition to mixed liquid fertilizers. Laboratory and field tests have shown that this insecticide powder remains in perfect suspension during application.

In field tests, samples were taken from a custom applicators truck. No agitation except the truck's motion in the field was available. Samples were taken from the first spray from the truck, from the middle section and just before the truck was empty. No significant difference in insecticide content among these samples was found.

A special liquid emulsifiable insecticide concentrate has very recently been developed to add to mixed liquid fertilizers and to nitrogen solutions. This concentrate provides excellent emulsions which remain stable during the normal application period. The concentrate is designed for a broad application, and the stability of the emulsions varies depending on the fertilizer formulation. For any one formulation of fertilizer, an emulsifiable insecticide concentrate can be made that will provide very stable emulsions.

There seems to be a large amount of uncertainty as to the danger of using insecticides in fertilizer. The chlorinated insecticides are provided as formulated concentrates for the fertilizer industry. Even the technical materials carry a "CAUTION" label and not a "WARNING" label. By the correct use of application equipment, very little insecticide should escape from the fertilizer to constitute any sort of health hazard. In these situations where the unpleasant odor of liquid concentrates is objectionable, dry non-dustable sticker concentrate is available which offers no odor in formulation with fertilizers.★★

PESTICIDE OUTLOOK

(*From Page* 38)

200,000 acres of western timber infested with spruce budworm will be aerially sprayed with DDT. *Ground spraying against bark beetles will be unimportant in* 1956.

It is expected that an accelerated program to eliminate the gypsy moth in the northeastern United States will be initiated in 1956. This would involve about 1,000,000 acres to be sprayed with DDT during May and June.

To control grasshoppers in 1955 over 1,600,000 acres of range land in eleven states were sprayed with insecticides by airplane in state-federal cooperative programs. More than 95,000 acres in six states were baited against the mormon cricket. Late summer and fall surveys in 1955 indicated the grasshopper threat in range lands of the Southwest to be more widespread and severe than at any time in recent years. Moreover, grasshoppers appear generally more threatening to crop areas in 1956 than in 1955.

Surveys of fall populations of European corn borer larvae in 1955 showed most of the heaviest infested counties in the Midwest to be in the northern half of Illinois and the eastern two-thirds of Iowa. However, the insect was not so serious a pest in 1955 as during the previous season.

The armyworm was not of widespread importance in 1955 compared to 1953 and 1954 when it occurred in epidemic numbers over large areas in the Midwest.

Last year populations of the spotted alfalfa aphid were heavier, primarily in the Southwest from Oklahoma to California. This insect is likely to be present again in 1956 in damaging numbers over a larger area in this region.

Aerial Treatment Review

AERIAL treatments with pesticides and defoliants in the United States, according to the annual survey of Industrial and Agricultural Aviation Activities by the Civil Aeronautics Administration, were made on fewer acres (31,063,000) in 1954 than in 1953 when the treated acreage was reported to be 33,922,000. The total material applied dry in 1954 amounted to 234,056,000 pounds, and liquids 90,706,000 gallons of diluted spray materials. The hours flown in these activities were 541,006 in 1954, compared to 591,

Table 3.
Manufacturers stocks of pesticides September 30, 1955 compared with 1953 and 1954 (technical basis)

Materials	Stocks on hand Sept. 30, 1955	Percent of 1955 stocks reported as formulations	Percent that Sept. 30, 1955 stocks are of stocks on Sept. 30, 1954	Sept. 30, 1953
BHC, including lindane (gamma basis)	3,900	52.9	60	68
Calcium arsenate	1,625	17.7	24	15
DDT	29,250	50.0	101	94
2,4-D (acid basis)	10,000	54.7	122	120
Lead arsenate	6,900	19.1	109	106
Sulfur, ground	36,000	47.3	112	88
2,4,5-T (acid basis)	est. 2,000	58.3	89	78
Aldrin, chlordane dieldrin, heptachlor, toxaphene[1]	16,400	50.2	96	61
Captan, chloro-IPC, DDD, dithiocarbamates, malathion, methoxychlor, parathion, sodium TCA[1]	20,800	47.6	178	169
All materials[2]	153,000	47.6	98	83

[1] Figures for materials produced principally by less than three firms are not given indiivdually.
[2] Included are a number of chemicals not named above.
Source: Survey by U. S. Dept. of Agriculture in cooperation with the National Agricultural Chemicals Association.

Table 4.
Airplane dusting and spraying in Mississippi

Year	Form applied	Acres treated	Amount applied
1953	Dust	1,302,801	18,090,820 lbs.
	Spray	364,256	682,567 gal.
1954	Dust	788,259	12,059,882 lbs.
	Spray	474,487	3,295,895 gal.
1955 (est.)	Dust	2,453,036	48,239,528 lbs.
	Spray	2,851,922	19,775,370 gal.

Source: Mississippi Aeronautics Commission.

BERKSHIRE B C I CHEMICALS
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SPECIALISTS
in
MAGNESIA
for
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EMJEO (80/82% Magnesium Sulphate) Calcined Brucite (fertilizer grade) 65% MgO

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(95% Nitrate of Potash)
for
Special Mixtures and Soluble Fertilizers
Other Fertilizer Materials

Insecticides - Fungicides

Mercury Compounds
for Agricultural Use

DITHIOCARBAMATES

FERRIC — ZINC

EXPORT-IMPORT

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491 in 1953. Figures for 1955 are not yet available.

Of the total acreage (7,172,000 acres) treated in California in 1954, 56 percent was by aircraft. Somewhat less than half (46 percent) of the acreage treated from the air was dusted. Of the acreage treated with ground equipment, 83 percent received liquid sprays.

According to the South Dakota Department of Agriculture, 238,733 acres were treated with pesticides from the air in 1954. A preliminary report from the Oklahoma State Board of Agriculture for 1955 shows the aerially treated area there to have been 433,514 acres. Data from the Mississippi Aeronautics Commission indicate a huge increase in aerial dusting and spraying in that State for 1955 over 1954, largely because of the cotton insect situation last season (table 4).

Information regarding acreage treated from the air and quantities of materials used is not available from most States, although more States having an airplane applicator law are likely soon to require the logging of airplane applications.

Granular insecticides have emerged as a new development with promising advantages particularly in ease of application and increased efficiency. By their use, drift is avoided. Positive penetration of vegetation can be secured in the control of mosquito larvae, turf and pasture pests, and corn rootworm. Formulation of fertilizer-insecticide mixtures is more efficient with granulated pesticides.

Insecticides used in fertilizer-insecticide mixtures are the chlorinated hydrocarbons effective in the control of many soil and turf insects. These mixtures are recommended in about 26 states. In 1954 over half the mixtures consumed in the United States were applied to corn. Total use has been estimated at 90,000 tons for 1953, 150,000 tons for 1954, and 200,000 tons for 1955. A considerable further increase is expected in 1956.

Supplies of insecticides and fungicides distributed by 23 major regional farm supply cooperatives during the fiscal year 1953 had a value of $10,177,000. This amount increased 17.4 percent to $11,950,000 in 1954. For the same years fertilizer sales increased 5.7 percent.★★

WASHINGTON REPORT

(*From Page 75*)

greater use among leaders of the pesticide industry.

While general distribution is made by the Department of Agriculture on a carefully developed mailing list, some additional copies are available by writing directly to Dr. Shepard, Commodity Stabilization Service, U. S. Department of Agriculture, Washington 25, D. C.

* * *

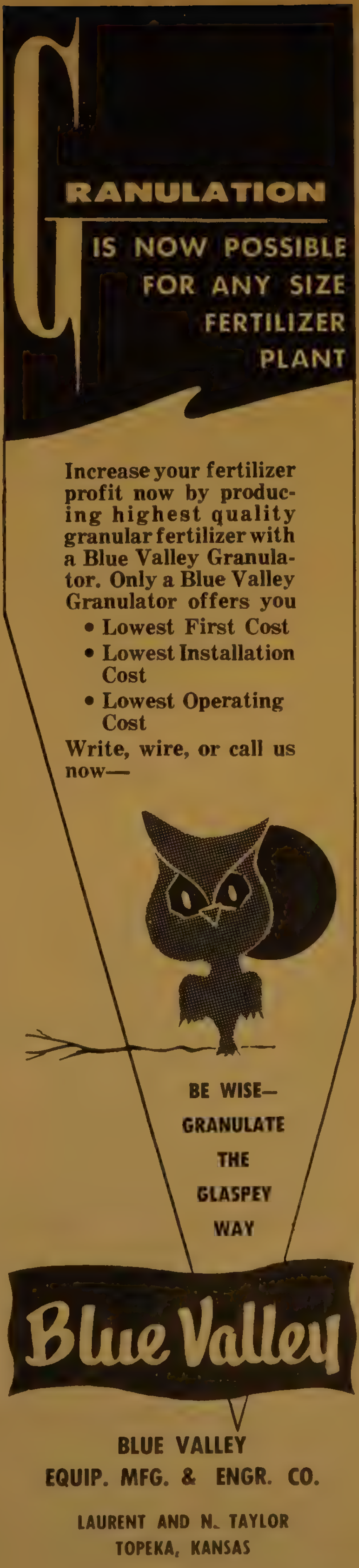
It is becoming more apparent that the farm bill will soothe more than it heals. With agriculture's problem running deep, it's doubtful that either party can change the direction of the current, particularly in an election year.

The measure will help protect farmers from the tightening money market. It does give farmers assurance that farm prices will hold at somewhat higher levels for the basic commodities. It serves notice for everyone willing to listen that try as it will the government can not make farming profitable for everyone. Efficient production is more and more at a premium - and pesticides, properly used, make a farmer more efficient. The same applies to fertilizers, and efficient production is high on the list of important subjects for discussion at the National Plant Food Institute's annual meeting.

* * *

Agricultural leaders and industry representatives generally applaud the recognition given to Dr. Karl S. Quisenberry who succeeds Dr. Albert H. Moseman as the new Director of Crops Research. Moseman becomes agricultural Director of the Rockefeller Foundation.

Dr. Gotthold Stiener, Chief, Nemotology Division, U. S. Department of Agriculture, wins the acclaim of his colleagues as he retires from ac-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tive service. He is succeeded by his assistant Albert L. Taylor, widely recognized as outstanding in his field.

ORGANIC MATTER

(*From Page 48*)

tivation. Good rotation systems and other proven soil management practices, supplemented with generous applications of chemical plant nutrients, are now maintaining a satisfactory organic matter content. That soil conservation in all its phases is a by-product of good farming is being proved on thousands of Corn Belt farms.★★

GOVERNMENT CONTROLS

(*From Page 40*)

relief and at the same time work toward a sound long-term solution. The government participated actively in the pork promotional campaign. We purchased more than 197 million pounds of pork for distribution in the school lunch program. Over 100 million pounds of lard have been sold to foreign countries. As a result the hog production and marketing situation is already adjusting and hog prices have stabilized at a favorable level. Farmers' hog breeding programs are down substantially, and marketings this summer should drop below last year's levels. Prices will begin the upward phase of the price cycle. Efficient producers will be free to plan hog production on their individual farms in keeping with sound management and good husbandry. No Government planner will be needed to tell them how many sows they may breed, how heavy they can make their hogs, or when or where they must market them.

Unfortunately this is a political year. In the months ahead, frequent attempts will be made to place agriculture on the political auction block. But American agriculture is neither Republican nor Democrat, and its welfare must not be sacrificed on the altar of partisan politics.

We must chart an economically sound course of action, even though it doesn't promise any white rabbits out of a hat. We must recognize that the combination of incentive price and production control program we have been following leads only to further imbalance between production and consumption, to uneconomic patterns of production, to vanishing markets, to still further production restrictions, to the politics of "equal shares" among producers, and toward a peasant agriculture.★★

ALFALFA APHID

(*From Page 45*)

hand. With the promise of added relief as the result of introduced parasite establishment and the development of resistant alfalfa strains materialize, a more balanced level of population intensities is anticipated for the future.★★

FERTILIZER VIEWS

(*From Page 65*)

put is not distributed uniformly as you can see from the following: 60% of the total U. S. farm output comes from about 2 million large family-operated commercial farms; 25% from big commercial operations; 8% from small family farms, 7% from 1.7 million so-called "farms" which in fact are but rural residences whose owners are not fulltime professionals. To get our thinking straight we should distinguish between the real productive commercial farmers who produce about 85% of the farm output and the suburbanites. Fertilizer manufacturers and other groups serving agriculture should keep these classifications separate when studying the farm market and setting up quotas for each sales territory.

According to the U. S. Department of Agriculture, a century ago about 14 out of every 20 persons in our country were employed in agriculture, and hence 6 out of 20 were left to carry on manufacturing, transportation and trades. Today only 3 out of 20 persons are employed in agriculture, leaving the other 17 to be employed in non-farm operations.

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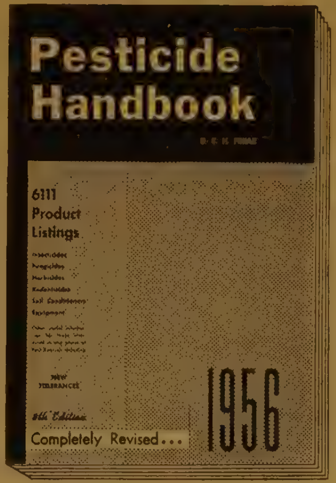

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about the editor—
Dr. Donald E. H. Frear. Editor of PESTICIDE HANDBOOK 1956, is one of the leading authorities on the chemistry of pesticides. He is the author of "Chemistry of Insecticides and Fungicides," the first book dealing with this subject published in the United States. In addition, he has written several other books, including "Chemistry of Insecticides, Fungicides, and Herbicides." Dr. Frear is Professor of Agricultural and Biological Chemistry at The Pennsylvania State University.

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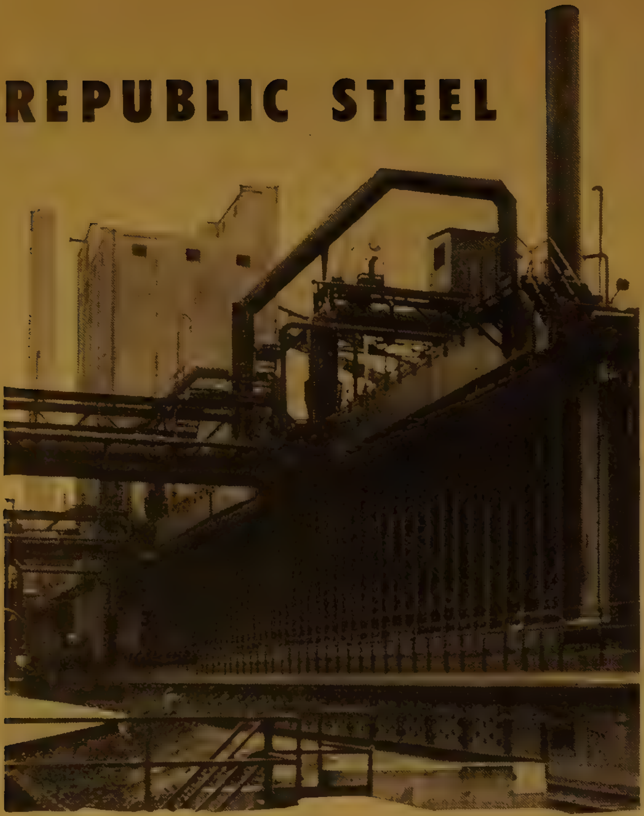

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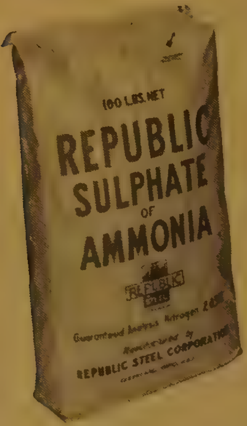

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The trend in farm employment continues to be downward. That so few out of the total population can feed an ever increasing number of people is explained by the vast change in farming technology represented by mechanization and the use of chemicals and power equipment. Growing food and fiber for the Nation is still the country's most essential industry. Without its marvelous expansion in the use of powered equipment, fertilizers, pesticides and weed killers this essential job could never be done by the relatively small proportion of the country's man-power employed in our agriculture—a real technical and mechanical revolution. But instead of the 16 million or so persons who are being classified as real farmers the actual number is nearer 6 million, according to the late farmer-author, Louis Bromfield, who insisted that the Congress should take this fact into consideration when computing price supports, soil banks, farm totals and so on.

Industrialized farming is eliminating the inefficient frontier type of farming. In its place we have fewer, highly efficient, better informed business farmers working with expensive machinery and chemicals to get the maximum return from their large investment in livestock and land. The small inefficient farmer is today's economic problem. It is he who cannot make a good living on his small acreage regardless of how high prices are. His best hope is to get a good job in town.

• Decline of U. S. Farming

"THE most important development in the history of American agriculture, by all odds, has been the spectacular way its productivity has improved in the past quarter century. Farm efficiency, lagging for years, has risen faster over the past ten years than the efficiency of the rest of the economy. . . . The average U. S. farm worker is 110 percent more productive than he was 25 years ago and so 37 percent *fewer* farm workers, putting in *fewer* hours, are producing 54 percent *more* than U. S. agriculture produced 25 years ago. Only 13.5 percent of the nation's population, against 25 percent in 1930, now lives on the land."

With the above introduction, Gilbert Burck in a recent issue of *Fortune* discussed what he was pleased to call—"the magnificent decline of U. S. farming." The efficiency of American agriculture is indeed remarkable, and the efficient farms are becoming industrial organizations in the fullest sense of this term and anxious to become even more efficient. During this period of wonderful progress, our agriculture has shifted from its dependence upon animal and human muscle to fertilizers, chemicals and electric and gas-powered machines. Our farming has become mechanized, capitalized and specialized and agricultural technology is moving swiftly ahead. Its purchases now run at the rate of about $15 billion a year.

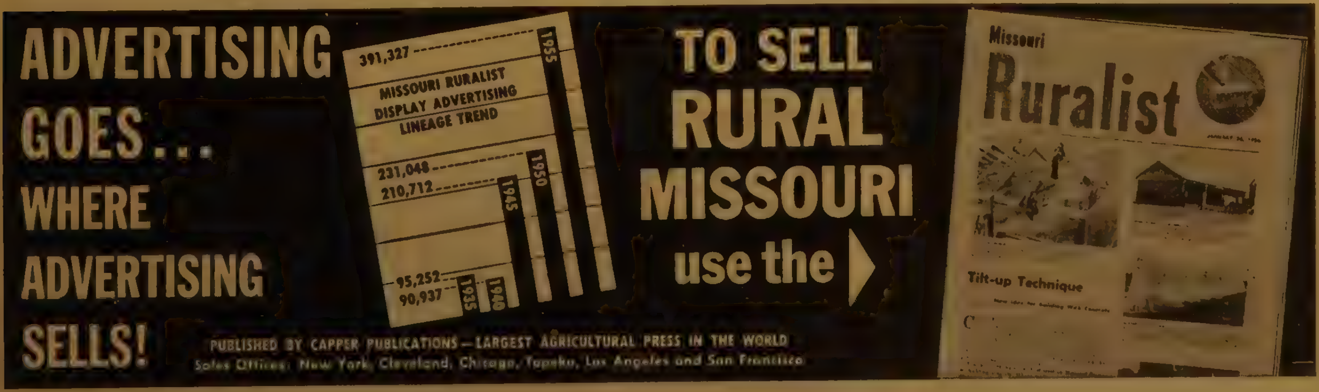
The idea of producing plenty of food and fiber on less land at lower unit cost is sound, despite the current surpluses in some commodities and the political "jitters." True, total farm income is down about 15 percent from what it was some five years ago; yet the average farm operator is only about 5 percent worse off than he was in 1950. And farm real estate values are now much higher. Two thirds of American farms are free of debt and the net worth of average farmer is about eight times his debt.

Some persons are blaming research and technological developments for what they are pleased to call our "present farm problem" and would solve it by putting a halt to further research in private and government laboratories. That way of course is folly. We need more research not less. It is in the national interest for the long pull to keep on increasing efficiency on the farm. Even now, despite agriculture's great progress, it is only 53 percent as efficient in output per man-hour as the rest of the economy. Most farmers can still cut their production costs by the efficient use of fertilizers and pesticides regardless of the number of acres they cultivate. We should not fear progress.★★

HERBICIDE STORY

(From Page 69)

the efficacy of these herbicides for controlling the stem rot (*Sclerotium rolfsii*), leafspot (*Cercospora arachidicola*), and stunt root (*Belonolaimus gracilis*) diseases of the Jumbo Runner peanut.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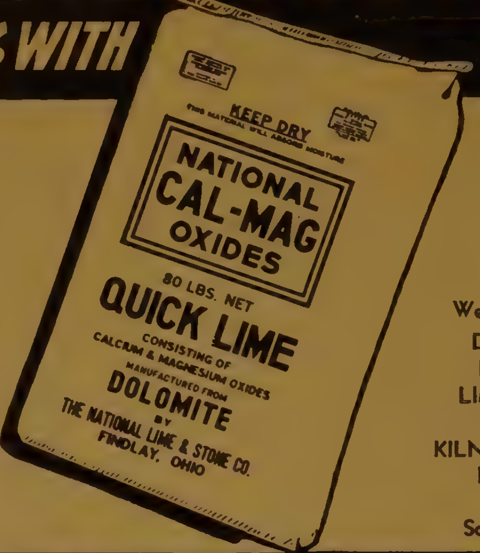
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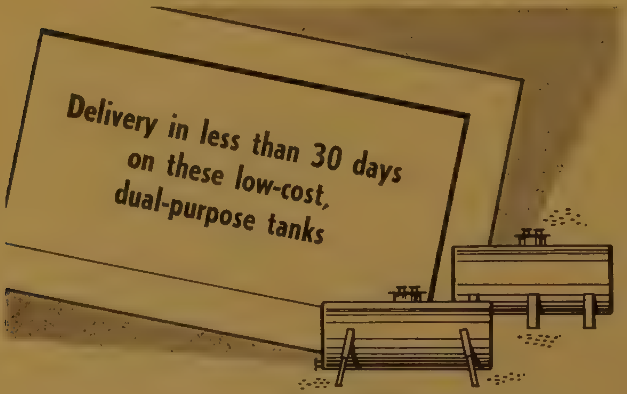
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The incidence of stem rot was recorded on four farms where DN had been used as a pre-emergence herbicide at 9 pounds per acre. The number of dead peanut plants per 300 feet of row showing evidence of infection by *Sclerotium* was recorded from each of four replicates on September 1. Untreated plots received five cultivations and treated plots three late cultivations. Little stem rot occurred in Virginia in 1955 but the DN-treated plots showed less stem rot than untreated plots (Table 5). In check plots which were cultivated, five times more soil was moved over the crown and over the ends of the lateral branches than in the DN-treated plots, which had only three late cultivations. Perhaps the covering of the crown and lateral branches with soil to control weeds may be especially important in aiding the development of certain diseases. Chemical control of weeds may help the control of these diseases indirectly, by making the early cultivations unnecessary.

The amount of Cercospora leafspot was measured on one farm where DN at 12 pounds per acre and PCP at 30 pounds per acre were applied broadcast in a water spray immediately after planting as pre-emergence treatments. Untreated plots which received normal cultural treatments (five cultivations and two hand hoeings) served as checks. The treated plots were not cultivated and weeds not controlled by the chemicals were removed by hand. On August 30 the number of spots on leaflets from 10 central stems from each of 4 replicate plots was recorded. Fewer leaflets were infected in the plots treated with either DN or PCP than in the cultivated untreated plots (Table 6). There are several possible explanations for the differences in the amount of infection. Most of the Cercospora inoculum is present in the soil early in the season, and the herbicides may have reduced the amount of inoculum. Also, the practice of covering the branches of peanut plants with soil to control weeds in untreated plots may place the inoculum in a more favorable position to infect the leaves. The covering of plants may also retard the development of the plants and thereby increase their susceptibility to leafspot.

At another farm where the stunt root disorder was the principal limiting factor in peanut production, the effect of pre-emergence DN and PCP treatments on the sting nematode was measured. DN was applied at 12 pounds per acre and PCP at 30 pounds per acre. The experiment was arranged in a split block design with four replications. Each herbicide-treated area was divided so that half of it was cultivated five times and the other half received no cultivation. Sting nematode puncture readings on the fruits were made on October 10 by counting the number of punctures per square centimeter on ten fruits from each of 4 replicate plots. The results are summarized in Table 7.

Growth ratings made on July 6 showed that the plants were larger in the uncultivated plots. It is believed that the difference in size of the plants was due primarily to the retarding of plant development following each of the first three cultivations. Plant size was not affected by either DN or PCP, but fruits from plants in PCP plots had fewer punctures than those from the DN treated plots.★★

TABLE 7.

The relative effect of DN and PCP on peanut plant vigor and fruit punctures of the sting nematodes

	Growth rating[a]		Average number of sting punctures/ square cm. on fruit	
Herbicide	**Normal cultivation**	**No cultivation**	**Normal cultivation**	**No cultivation**
DN, 12 lbs. /A	3.5 A[b]	4.9 A	13.0 A	22.4 A
PCP, 30 lbs./A	3.4 A	4.9 A	3.9 B	5.7 B

a—Poor growth—1, Excellent growth—5.
b—There is no significant difference (5% level) between values in a column that is followed by the same letter.

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FUNGICIDE TESTS

(From Page 61)

Apple scab was controlled and there was a minimum of fruit injury when any one of several organic protective fungicides was used in cover sprays. Fungicides that contain captan have given excellent results in all areas where applies are grown. Materials containing ferbam, glyodin, and dichlone and such fungicides as the Vancides A and M, Thylate, and Crag 341 were used successfully by many cooperators who reported results of their tests.

Sulfur compounds and Karathane have been used in most areas for control of apple powdery mildew. A combination of captan and zineb has been particularly effective against such apple diseases as sooty blotch, black rot, fly speck and "X" spot. Thiram gave good control of apple blotch.

In California 1 application of either ziram or ferbam gave better control of peach leaf curl than did nabam, captan, Bordeaux mixture, or maneb. Powdery mildew of peach was controlled by 3 applications of liquid lime sulfur or by 1 application of this followed by 2 of either wettable sulfur or Karathane. Karathane was phytotoxic at 1 lb./100 gal.

Phytophthora brown rot of lemons was most effectively controlled by Robertson's copper fungicide plus lime or with zinc and copper sulfates plus lime.

Black rot of grapes was controlled with Coro SDD plus iron sulfate, ferbam, zineb, captan, or maneb. When Emperor and Tokay grapes were dusted 4 times with a captan-sulfur dust, considerably less rot occurred in storage.

Ziram, or maneb controlled anthracnose of black raspberries in Michigan. Maneb is recommended for grower use.

Gray mold of strawberries in Michigan was controlled best by captan, zineb, or ziram. Captan controlled strawberry fruit rots in Virginia better than did Tennam, zineb, or Agri-mycin.

Bordeaux mixture, ziram, and captan were all effective against brown rot blossom blight, scab, and shot-hole of almonds. Coromerc was better than Sinox General as an eradicant dormant spray to eliminate inocula of scab and shot-hole pathogens. Pecan scab was controlled with 5 summer sprays with ziram, following 1 eradicant spray with PAS, Dowicide G, or Corona CM220.

Fungicides containing captan gave excellent control of Alternaria leafspot of carnations in New York, while those containing zineb or maneb gave best control of rust of both carnations and snapdragons. Rust of Merion bluegrass was controlled by zineb alone, or by zineb followed by Acti-dione or captan.

Blackspot of roses was controlled effectively by maneb, zineb, captan, or ferbam sprays. Maneb dusts or sprays and captan sprays were effective against Cercospora leafspot of roses.

Rust of pole beans in Florida was controlled by maneb-sulfur, zineb-sulfur, or sulfur dusts. Copper-containing fungicides were best against downy mildew of lima beans in New York, but maneb, captan and Crag Potato Fungicide 658 were effective also.

"Results of 1955 Fungicide Tests" reprinted from a series of articles appearing in "Agricultural Chemicals," April through June, may be purchased in bound and covered form for $1.00 per copy by sending orders with remittance to Dr. A. G. Newhall, Department of Plant Pathology, College of Agriculture, Cornell University, Ithaca, New York. The publication of these results is under the sponsorship of the American Phytopathological Society.

The Temporary Advisory Committee on Collecting and Disseminating data on New Fungicide Tests of the American Phytopathological Society arranged for the recent publication of data and the continuation of a program for annual publications of Fungicide Test Results in the future. Dr. A. G. Newhall, Cornell University, Ithaca, New York, is in charge of this project.

Early blight of celery in Ohio was controlled best by tank mixed zineb.

Maneb was more effective than either copper-containing fungicides or organic fungicides in controlling cucumber downy mildew in New York. Cucumber anthracnose was controlled best in Ohio by maneb or captan. In New York, captan and dichlone were effective, but maneb was not.

Zineb, maneb, or zineb-Karathane sprays were best for cantaloupe powdery mildew control in Florida. Tribasic copper sulfate plus zineb gave good control of this disease in California.

Sprays of zineb, maneb, or zineb-captan controlled Cercospora leafspot of watermelon in Florida.

Purple blotch of onions was controlled with zineb or cuprous oxide in Colorado. Maneb or Tribasic copper sulfate was effective in New York, and gave better control than did zineb, Crag 658, Tennam, ziram, captan, or streptomycin.

Zineb or maneb gave good control of early blight of potatoes in 2 states. Inorganic copper fungicides were effective in Ohio, but plots sprayed with these materials yielded less than did those sprayed with maneb or zineb. Nabam, Cop-O-Zink, or Tribasic copper sulfate gave best control of potato late blight in Maine.

Sprays containing zineb or maneb generally gave excellent control of early blight, late blight, and anthracnose of tomato. B-622 (Ethyl Corp.), along with maneb, effectively controlled tomato anthracnose in New York.

Antibiotic-containing sprays and dusts were tested in several states for disease control in tobacco plant beds. Streptomycin sulfate gave good control of wildfire in Maryland and Tennessee and give fair control of blue mold in Florida. In South Carolina, however, zineb controlled blue mold better than did either streptomycin or Agromycin A or Agromycin C.

Fire blight of apples in Iowa was controlled better by Bordeaux mixture than by Agri-mycin, and Copper A compound, although slightly phytotoxic, was better against bacterial blight of walnut than was Agri-mycin.

Agristrep, Agri-mycin, and Phytomycin were effective in Maryland against diseases of lima beans that are caused by *Phytophothora* spp. Broccoli downy mildew was controlled by streptomycin.

Streptomycin prevented development of bacterial soft rot in cantaloupes after having been applied in paste form to stem scars of harvested fruit.

Streptomycin sprays greatly reduced pepper bacterial spot in Florida.

Agri-mycin, streptomycin, Agristrep, Floramycin, and Phytomycin gave good control of bacterial spot of tomato, and the first 2 antibiotics named are recommended for grower use.

On the basis of limited data reported, antibiotic treatments seem to be most effective against pathogenic bacteria and some downy mildew fungi. Where sprays were compared with dusts, the former appeared to be more effective.

Mercury-containing seed treatment fungicides gave best control of wheat bunt, while seed dressings of Thiram, captan, dichlone, Delsan, Panoram D-31 were effective against seed decay and seedling blights of corn.

Seed treatments of the small-seeded forage grasses and legumes did not increase standads in Idaho. In Alabama, where head smut of fescuegrass is important, Ceresan M or Agrox seed treatments were benficial.

Captan dust is recommended for onion smut control in New York. Either seed are treated, or dust is blown into furrows at planting time.

Results of soil treatments for controlling diseases caused by soil-borne fungi were submitted. Mixtures containing captan and PCNB performed fairly well against seedling diseases of cotton. Maneb, captan and PCNB controlled damping-off of sugar beets, but PCNB was toxic at 1.5 lb. actual/A. Maneb and captan are recommended for grower use on a limited scale. PCNB is recommended for Sclerotium rot of bulbous iris.

Collar rot of peanuts was significantly reduced in soils that had been fumigated with some nematocides. Dowfume W-85 and Liquid Nemagon will be recommended for grower use.

PCNB soil treatment was more effective than were treatments with captan, maneb, or nabam plus zinc sulfae in controlling seed decay and root rot of red kidney beans.

Soil applications of Semesan, Setrete, or Agrox gave increased yields of shallots grown in soils infested by the pink-root pathogen.

Vapam was beter than PCNB against potato scab in Maryland.

Root knot nematodes were controlled by soil fumigation with Dowfume W-40 in tobacco beds in South Carolina, with Dowfume W-85 in strawberry beds in Louisiana, and with D-D mixture in onion fields in New York. Dowfume W-85 at 8 lb./A. was slightly toxic to onions.

Methyl bromide is recommended for nematode control in celery beds in Florida. To control nematodes, weeds, and damping-off, either a mixture of D-D and allyl alcohol or a mixture of D-D, allyl alcohol and formalin is recommended for trial use by growers.★★

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Tale Ends

THE seventeen-year cicada is scheduled for another appearance this season. Although this year's brood, which has been tagged Brood XIII, is not considered one of the major ones, it did cause considerable damage in northern Illinois back in 1939. In addition to northern Illinois it will probably also center its activities around southern Wisconsin and eastern Iowa in its 1956 appearance.

AC

One of the leading three-year old race horses of the current season is owned by two fertilizer manufacturers. Gene Van Deren and O. S. Deming, partners in a fertilizer business at Cynthiana, Ky., have had considerable success with Toby B who walked off with the Blue Grass stakes at Keeneland, after a successful winter racing season in Florida.

AC

The movement to change present fertilizer labeling practices continues to enlist converts. The May 18th issue of "Cornell Veg-News" advocates a change to show the actual amounts of N, P and K on the label instead of N, P_2O_5 and K_2O. Admittedly much confusion would inevitably result during the transition period, but the end result would be for the good. It is pointed out that the change over would simplify the teaching of what an analysis really means. It would also make it much easier to set up fertilizer recommendations on the basis of pounds of actual nutrients to apply per acre. Undoubtedly the proposal will receive further consideration at the October session of fertilizer control officials in Washington.

AC

The battle for the control of Virginia-Carolina Chemical Corp. goes on. The Zickl group has written to V-C stockholders within the past month asking that stockholders communicate their wishes regarding control of the company through "letters of intent." Joe Howell, president of V-C, has challenged the Zickl interests to "reveal concrete plans for improving the company instead of asking stockholders to buy a pig in a poke." Meanwhile he points out that, under present management, stockholders equity rose from a figure of minus $23.12 a share in 1945 to plus $26.61 a share on June 30, 1955, an increase of almost $50.

AC

Force feeding fertilizer to plants is under study by a Michigan State graduate student, Martin Bukovac, who is attempting to find out why some plants will not absorb certain types of fertilizers from sprays any further than the leaves. In one series of experiments on bean plants, which will not normally absorb calcium sprays beyond the leaves he tried doping the plants with ether. The experiment worked, the calcium going all the way to the roots.

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WEEVILS SLEPT HERE LAST WINTER; PROTECT YOUR CROP WITH TOXAPHENE

Ideal conditions for the overwintered boll weevil and a mixed population of other pests—coupled with new government regulations—make it more important than ever before to get the most from every acre planted to cotton this season.

Cotton growers have learned from last year's experience that early-season control of insects with toxaphene pays off in higher yields at picking time. Many farmers who used toxaphene regularly throughout the season obtained excellent weevil control—even in those sections of the cotton belt where infestations were extremely heavy. Some of these farmers reported the highest yields per acre in their experience.

This year every boll counts. Toxaphene applications will protect the crop all through the season. Dealers now have supplies of this dependable insecticide to meet the requirements of their customers.

TOXAPHENE dusts · sprays

THE CHEMICAL BASE FOR TOXAPHENE IS PRODUCED BY HERCULES FROM THE SOUTHERN PINE

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